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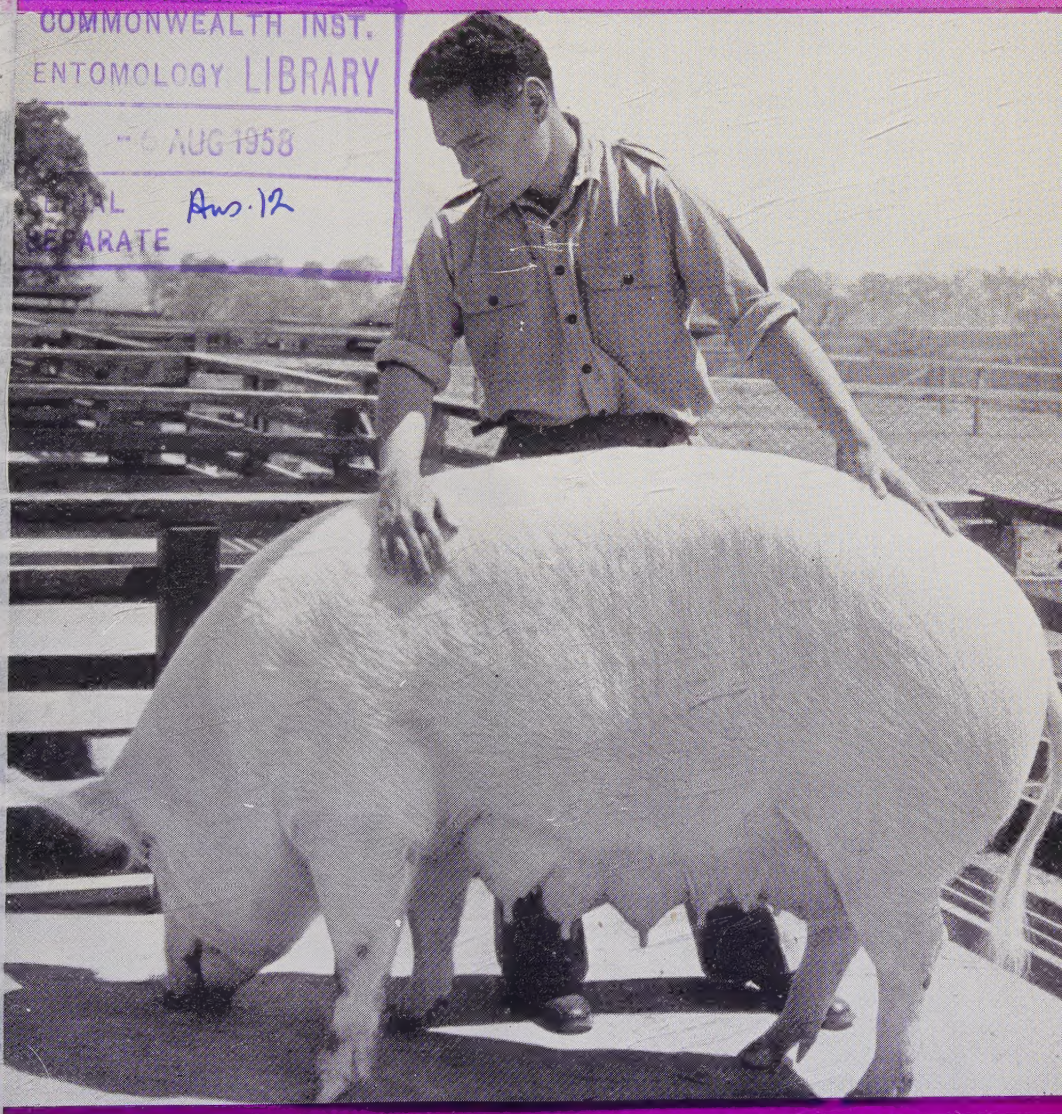

GATTON STUDENT WITH PRIZE-WINNING SOW.

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Editor: E. T. Hockings.

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He Served Agriculture

Mr. A. F. Bell, M.Sc., D.I.C., A.R.A.C.I.

Tributes of the highest order have been paid, since his death last month, to the outstanding service given to agriculture by Mr. A. F. Bell, who had for 11 years carried out so successfully the important duties of Under Secretary for Agriculture and Stock.

Many of these acknowledgements referred to Mr. Bell's reputation as a brilliant scientist and administrator, which was recognised not only in Queensland and throughout Australia, but in many overseas countries as well.

The former Under Secretary was held in the highest respect by all his officers and staff, and his overall ability was recognised as a paramount factor in the acknowledged success of more recent departmental work.

Mr. Bell was born at Laidley, in the Lockyer Valley, in November, 1899. He received his primary education at the local State school, where he won a scholarship to the Ipswich Grammar School in 1913. He entered the Public Service in 1916 as a cadet in the chemical laboratory of the Department of Agriculture and Stock. In 1917 he enlisted in the First AIF. After his return he rejoined the laboratory staff and started a part-time course at the Queensland University.

After graduating as Bachelor of Science in 1924, he was awarded the sugar research travelling scholarship. He was overseas for four years, attending the Universities of California and London.

On his return to Australia in 1928, Mr. Bell was appointed pathologist to the Bureau of Sugar Experiment Stations, and later became Director. During that period of his career he was responsible for notable work in the control of sugar pests and diseases. In 1947 he was appointed Under Secretary.

Mr. Bell's advice was often sought by governments and he held a large number of important posts that included: Chairman of the Brisbane Milk Board; Deputy Chairman of the Sugar Experiment Stations Board; member of the State Development Works Advisory Committee; Deputy Chairman of the Bureau of Investigation of Land and Water Resources; member of the Queensland Bureau of Industry; Chairman of the United Nations Food and Agriculture Organisation State Committee; member of the Faculty of Veterinary Science in the Queensland University; member of the Commonwealth Scientific and Industrial Research Organisation Council, and Chairman of the C.S.I.R.O. State Committee. He was a member of the Pastoral Land Settlement Royal Commission in 1950; a member of the Committee that inquired into the Queensland-British Food Corporation; and of the Commonwealth Committee of Inquiry into the sugar industry.

Major overseas visits made by Mr. Bell in recent years were: To New Zealand in 1948-49 to investigate the New Zealand system of abattoirs; to England in 1951-52 to attend the conference of the British Commonwealth Sugar Agreement; to Rome in 1955-56 as a member of the Australian Delegation to the 8th Session of the F.A.O. Conference.

In 1954 Mr. Bell became the first Queenslander to be awarded Australia's highest honour in agricultural science—the Australian Medal of Agricultural Science. In 1956 he was awarded the Farrer Memorial Medal in recognition of his distinguished service to agriculture.

Plate 1.

Ewes and Lambs Grazing Belar Oats, "Wyoming", 1957.
Grain shed at left background.

Cash in on Crop Grazing

By L. T. F. CURRAN, Adviser in Agriculture.

Over much of the State, oats has been a profitable winter grazing crop for many years. The following example from Central Queensland could be repeated in a number of other districts, and shows just what grazing is afforded by oats grown under sound farming methods.

With oats, there's no need for that set-back to stock which normally occurs every winter in Central Queensland. At least that's been the experience of several growers in the Capella area.

Look at the success of Mr. O. K. Benn, on "Wyoming", Capella. Last winter his sheep were feeding on 55 acres of lush oats—at a time when native pastures were poor and unpalatable.

What's more, he carried almost 10 sheep to the acre, including 300 lambing ewes, for nearly four months!

Remarkable? Not really. It is a result of experience plus good management. In previous years Mr. Benn proved the value of oats as a grazing crop. Now it's routine on "Wyoming".

Let's see how Mr. Benn does it . . .

Planting.

The area had grown oats the previous (1956) season. Land preparation for the 1957 crop commenced in November, 1956. Following a normal short summer fallow, Belar oats were planted on March 21st, 1957. Seeding rate was 40 lb. per acre.

The 55-acre block was temporarily subdivided into four paddocks before grazing. Subdivision fencing was made of ring-lock wire and steel posts.

To get highest returns, rotation of paddocks is a MUST.

Grazing the Oats.

Following an exceptionally dry April and May, grazing commenced on July 9th, 1957. Three hundred lambing ewes commenced grazing on a 10-acre portion. Later, as the

growth became more prolific, over 760 sheep and 240 lambs, plus two milking cows with well grown calves were pastured on the oats. Grazing ceased on October 23, 1957.

Throughout the period of grazing, the sheep also had access to 100 acres of poor native pastures. This provided roughage and enabled them to make better use of the lush oats.

The total grazing over the period is set out in Table 1. In this table, the groups overlap to some extent. (The area was rotationally grazed.)

TABLE 1.

GRAZING FIGURES FOR 55 ACRES OF OATS, BETWEEN 9–7–57 AND 23–10–57.

Number of Sheep.	Days Grazed.	Sheep Days.
300 ewes	61	18,300
16 rams	92	1,472
12 sheep equivalent	92	1,104
760 mixed adults ..	45	34,200
Total ..	..	55,076

Each milking cow has been regarded as the equivalent of six sheep.

The quantity of oats consumed by lambs and calves has been disregarded.

The total of 55,076 sheep-grazing-days on a 55-acre paddock gives 1,001 sheep-grazing-days per acre. This equals a carrying capacity of almost 10 sheep per acre over the actual period of grazing—106 days.

If the total grazing is spread over 12 months, the rate still works out at better than 2·75 sheep per acre—this is on land which under native pasture carries a sheep to 2½ acres.

However, the object of grazing oats is to combat a seasonal shortage. Therefore carrying capacity should only be calculated on the period when this shortage would normally occur, that is winter and early spring. Similarly the 100 acres of poor quality grass has been disregarded when working out the carrying capacity, as it provided only roughage.

Lambing commenced very soon after the 300 ewes were introduced to the

Plate 2.

A Good Crop of Young Oats, Capella District.

Plate 3.
Lush Winter Grazing, Capella, 1956.

oats. A good portion of this flock consisted of young ewes on their first lamb. Nevertheless 240 lambs were marked. The marking percentage (80) would possibly have been higher if there had been fewer young sheep in the breeding flock.

Rainfall at "Wyoming".

The average annual rainfall for the area is about 23 inches. Rainfall over the past few years has been well above average, but 1957 has been drier. During the actual growing period of the crop, however, rainfall was about average.

Water stored in the soil before planting obviously played a large part in the productivity of the crop. This is another case where good farming paves the way to success.

Plate 4.
Belar Oats Coming into Head, Capella, 1957.

Plans for Certified Buffel Grass Seed

By N. V. HIBBERD, Standards Branch.

It is hoped that certified seed of both Gayndah and Biloela Buffel Grass will be available for distribution in 1958.

In the past, the certification of seed in Queensland has been confined to some of the major agricultural and horticultural crops such as maize, sorghum, beans, tomatoes. Now, however, a new field has been opened up with the introduction of pasture species to the scheme. This field offers tremendous scope for seed certification as will be realised when one considers the vast number of pasture species grown under the wide range of climatic conditions prevailing in Queensland.

Following the formation of the Pasture Seed Certification Sub-committee, it was decided to concentrate efforts, for the present, on the certification of buffel grass seed (*Cenchrus cilaris*) although it was realized that the inclusion of other pasture species in the scheme would warrant consideration.

The reason for certifying buffel grass seed is, in general, as with other seeds, to ensure that the seed of particular varieties retains its trueness to type, that the seed can confidently be purchased and be known to be true to label, comply with a high standard of purity, and be capable of establishing a satisfactory plant stand, that is, have high germination.

Two varieties have been accepted for certified seed production, namely Gayndah buffel (which has become established in the Gayndah district), and Biloela buffel (which was previously known as type D but renamed "Biloela" to give recognition to the work carried out by the Biloela Regional Experiment Station in establishing this grass).

10-acre Minimum.

At present the minimum area that will be registered for certified buffel grass seed production is 10 acres, while the closing date for the receipt of applications for registration of areas is June 30, each year. The registration will remain in force for no longer than 12 months.

Provision is made in the buffel grass seed certification rules permitting areas to be grazed as an adjunct to seed production. However, it is stipulated that grazing stock shall not have had access for at least 14 days previously to Cenchrus hay, chaff or grazing of any kind of Cenchrus other than the strain to be certified.

Buffel grass has the characteristic of not cross-pollinating. This is a noteworthy feature as it means that contamination between two varieties cannot occur except through some mechanical means such as by introducing seed of another variety or species by machinery, by the carrying of foreign seeds on the hair of grazing animals, or by other mechanical means. Therefore, to guard against the possibility of introducing seeds of other Cenchrus species a minimum isolation distance of 10 chains from any plants of Cenchrus not recognized as pasture species is required before an area will be accepted for registration.

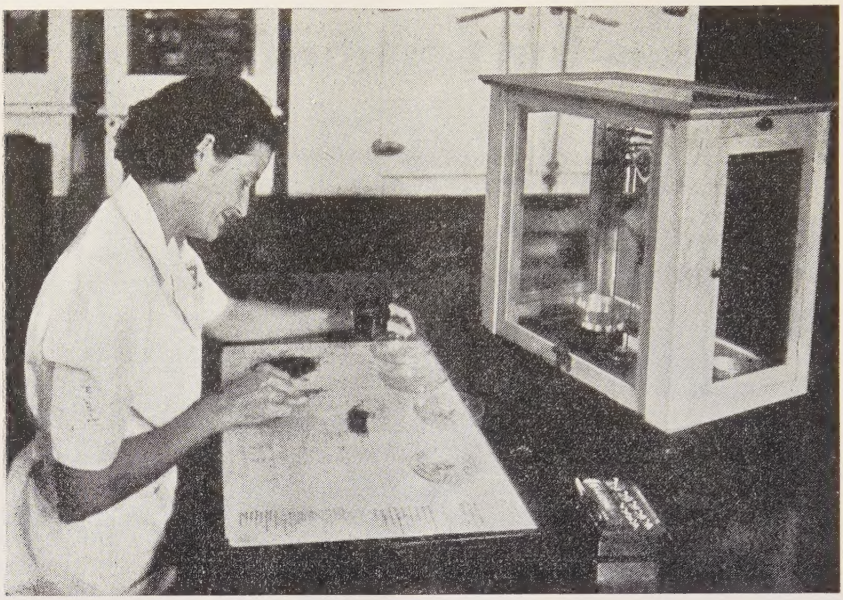


Plate 1.

A Sample of Certified Seed Being Analysed.

Where recognized pasture Cenchrus species are growing, the area for registration must be a minimum of two chains distant from such pasture species.

A further condition of the registration of an area is that the area shall not have grown any Cenchrus other than the strain to be certified during the preceding two seasons.

Seed Must be Approved.

Seed used for sowing areas for certification must be approved by the Seed Certification Committee. It is usually mother seed produced on Departmental experiment stations or if this is unavailable the committee may direct that certified seed be used. Whatever seed is used the aim is to use the best available in order to maintain a high standard in the certified seed.

An inspection of the planting machinery is made immediately prior to planting of an area for certification to ensure that stray seeds are not introduced to the area by this means. Inspections made each season during the growth of the crop consist of one at the time of emergence of the earliest seed heads and another just before maturity of the seed heads.

The buffel grass seed certification rules are very specific when dealing with the presence of Cenchrus weed species such as *Cenchrus echinatus*—Mossman River grass, *Cenchrus pauciflorus*—spring burr grass and *Cenchrus australis*—hillside burr grass. If any plants of these three species are found in an area of buffel grass being grown for certified seed production, the area will be rejected for certification.

This is quite understandable as much of the buffel grass grown for certification will, no doubt, be sold in wool-producing areas where the seed burrs of the weed species, if present, would cause considerable trouble. In any case these weeds are considered

sufficiently serious that their exclusion from all grazing areas of the State must be carefully ensured.

A further cause for the rejection of an area for certification is if plants showing undesirable varietal characteristics have not been rogued out prior to ripening of the seed.

Germination Requirement.

All samples of buffel grass seed for certification must comply with the standards for germination and purity of certified buffel grass seed which have been formulated by the Seed Certification Committee. The minimum germination requirement is 25 per cent., while 18 per cent. of inert matter such as straw is the maximum amount permitted. Because of the difficulty in harvesting buffel grass seed completely free of other seeds, allowance has been made for the presence of a trace of weed seeds and other crop seeds to the extent of 0.01 per cent. and 0.2 per cent. respectively.

Of course, weed seeds prohibited under the Agricultural Standards (Seeds) Regulations are not permitted in certified buffel grass seed.

These standards are more rigid than those required for uncertified buffel grass seed. In the latter case the minimum germination is 20 per cent. and the total amount of impurities allowed is 21 per cent. which includes an allowance of 1 per cent. of legume, grass and agricultural crop seeds and 1 per cent. of weed seeds.

Growers of buffel grass seed for certification should have little difficulty in producing seed which complies with the certification standards, even when harvested by machinery, providing reasonable care is taken when the seed is harvested. At present there is no known seed-cleaning machine capable of satisfactorily removing inert matter from machine harvested buffel grass seed.

During the 1957-58 season, areas of both Gayndah and Biloela buffel grass have been registered for certified seed production, and it is hoped that certified seed of both varieties will be available for distribution during 1958. It is expected that the supply will in no way meet the demand but at least the seed will form a nucleus from which interested parties will be able to establish pure stands of the grass.

A Good Wet Area Clover

"K.B.", of Harrisville, has inquired about the availability of a clover known to him as Shearman's Clover.

Answer: Shearman's clover is commonly known as strawberry clover.

The varieties of this clover usually for sale are Palestine and O'Connor.

This clover is used fairly extensively in irrigated pastures, especially in the lower lying areas of such pastures. It is considerably more tolerant of waterlogging than the other clovers. In association with Para grass it makes quite a good pasture mixture for wet areas.

The seed is readily available from all reliable seed merchants.

—*Agriculture Branch.*

Tuberculosis-Free Cattle Herds. (As at 1st June, 1958.)

Aberdeen Angus.

G. H. & H. J. Crothers, "Moorenbah," Dirranbandi
A. G. Elliott, "Ooraine," Dirranbandi
W. H. C. Mayne, "Gibraltar," Texas

A.I.S.

M. E. & E. Scott, "Wattlebrae" A.I.S. Stud, Kingaroy
F. B. Sullivan, "Fermanagh," Pittsworth
D. Sullivan, "Bantry" Stud, Rossvale, *via* Pittsworth
W. Henschell, "Yarranvale," Yarranlea
Con. O'Sullivan, "Navillus" Stud, Greenmount
H. V. Littleton, "Wongalea" Stud, Hillview, Crow's Nest
J. Phillips and Sons, "Sunny View," Benair, *via* Kingaroy.
Sullivan Bros., "Valera" Stud, Pittsworth
Reushle Bros., "Reubydale" Stud, Ravensbourne
A. C. and C. R. Marquardt, "Cedar Valley," Wondai
A. H. Sokoll, "Sunny Crest" Stud, Wondai
W. and A. G. Scott, "Welena" A.I.S. Stud, Blackbutt
G. Sperling, "Kooravale" Stud, Kooralgin, *via* Cooyar
C. J. Schloss, "Shady Glen," Rocky Creek, Yarraman
W. H. Thompson, "Alfa Vale," Nanango
S. R. Moore, Sunnyside, West Wooroolin
H.M. State Farm, Numinbah
Edwards Bros., "Spring Valley" A.I.S. Stud, Kingaroy
D. G. Neale, "Grovely," Greenmount
A. W. Wieland, "Milhaven" A.I.S. Stud, Milford, *via* Boonah
W. D. Davis, "Wamba" Stud, Chinchilla
Queensland Agricultural High School and College, Lawes
C. K. Roche, Freestone, Warwick
Mrs. K. Henry, Greenmount
D. B. Green, "Deloraine" Stud, Durong, Proston
E. Evans, Wootha, Maleny
T. L. and L. M. J. Cox, "Seafield Farm," Wallumbilla
J. Crookey, "Arolla" A.I.S. Stud, Fairview, Allora
M. F. Power, "Barfield," Kapaldo
A. H. Webster, "Millievale," Derrymore
W. H. Sanderson, "Sunlit Farm," Mulgildie
R. A. and N. K. Shelton, "Vuegon" A.I.S. Stud, Hivesville, *via* Murgon
R. R. Radel & Sons, "Happy Valley," Coalstoun Lakes
C. A. Heading, "Wilga Plains," Maleny
G. S. and E. Mears, "Morden," M.S. 755, Toogoolawah

Ayrshire.

L. Holmes, "Benbecula," Yarranlea
J. N. Scott, "Auchen Eden," Camp Mountain
E. Mathie and Son, "Ainslie" Ayrshire Stud, Maleny
C. E. R. Dudgeon, "Marionville" Ayrshire Stud, Landsborough
G. F. H. Zerner, "Pineville," Pie Creek, Box 5, P.O., Gympie
T. F. Dunn, Alanbank, Gleneagle

Friesian.

C. H. Naumann, "Yarrabine" Stud, Yarraman
D. J. Pender, "Camelot," Lytton road, Lindum
S. E. G. Macdonald, "Freshfields," Marburg

Guernsey.

C. D. Holmes, "Springview," Yarraman
A. B. Fletcher, Cossart Vale, Boonah
W. H. Doss, Degilbo, *via* Biggenden
A. C. Swendson, Coolabunia, Box 26, Kingaroy
C. Scott, "Coralgrae," Din Din Road, Nanango
R. J. Wissemann, "Robnea," Headington Hill, Clifton
G. L. Johnson, "Old Cannindah," Monto
A. Ruge & Sons, Woowoonga, *via* Biggenden
G. Miller, Armagh Guernsey Stud, Armagh, M.S. 428, Grantham
N. H. Sanderson, "Glen Valley," Monto

Jersey.

Queensland Agricultural High School and College, Lawes
J. S. McCarthy, "Glen Erin" Jersey Stud, Greenmount
J. F. Lau, "Rosallen" Jersey Stud, Goombungee
G. Harley, Hopewell, M.S. 189, Kingaroy
Toowoomba Mental Hospital, Willowburn
Farm Home for Boys, Westbrook
P. J. L. Bygrave, "The Craigan Farm," Aspley
R. J. Crawford, "Inverlaw" Jersey Stud, Inverlaw, Kingaroy
P. H. F. Gregory, "Carlton," Rosevale, *via* Rosewood
E. A. Matthews, "Yarradale," Yarraman
A. L. Semgreen, "Tecoma," Coolabunia
L. E. Meier, "Ardath" Stud, Boonah
A. M. and L. J. Noone, "Winbirra" Stud, Mt. Esk Pocket, Esk
W. S. Conochie and Sons, "Brookland" Stud, Sherwood road, Sherwood
Estate of J. A. Scott, "Kiaora," Manumbar road, Nanango
F. W. Verrall, "Coleburn," Walloon
C. Beckingham, Trouts road, Everton Park
W. E. O. Meir and Son, "Kingsford" Stud, Alberton, *via* Yatala
G. H. Ralph, "Ryecombe," Ravensbourne
Mrs. I. L. M. Borchert, "Willowbank" Jersey Stud, Kingaroy
W. and C. E. Tudor, "Boree" Jersey Stud, M.S. 498, Gayndah
Weldon Bros., "Gleneden" Jersey Stud, Upper Yarraman
D. R. Hutton, "Bellgarth," Cunningham, *via* Warwick
J. W. Carpenter, Flagstone Creek, Helidon
H. G. Johnson, "Windsor" Jersey Stud, Beaudesert
W. S. Kirby, Tinana, Maryborough
S. A. Cramb, Bridge st., Wilsonton, *via* Toowoomba
J. A. & E. E. Smith, "Heatherlea" Jersey Stud, Chinchilla
W. C. M. Birt, "Pine Hill" Jersey Stud, Gundiah
T. Nock, Dallarnil
P. Fowler & Sons, "Northlea," Coalstoun Lakes
F. Porter, Conondale
H.M. State Farm, Palen Creek
B. T. Seymour, "Upwell" Jersey Stud, Mulgeldie

Poll Hereford.

W. Maller, "Boreview," Pickanjinnie
J. H. Anderson, "Inverary," Yandilla
D. R. and M. E. Hutton, "Bellgarth," Cunningham, *via* Warwick.
E. W. G. McCamley, Eulogie Park, Dululu
Wilson and McDouall, Calliope Station, Calliope

Poll Shorthorn.

W. Leonard & Sons, Welltown, Goondiwindi.

How Much Silage for 50 Cows?

By L. A. WILLIS, Cattle Husbandry Branch.

What are the best crops to grow for silage, and what quantity should be stored as a drought reserve for a 50-cow herd?

Since the last drought particularly, many dairy farmers and cattlemen have been asking the same questions about silage. An answer can be given along general lines, with the advice that local conditions will dictate how many months' reserve should be allowed.

In the high rainfall areas, maize will produce the greatest tonnage of green material for ensiling. To ensure maximum crop yields, the use of hybrid seed and attention to fertilizer requirements are necessary.

In the lower rainfall areas, sweet sorghum can be relied upon to produce useful quantities of green material for you to ensile.

A comparison of estimated yields and food value of suitable silage crops indicates clearly the superiority of maize and sorghum for your cows.

Starch as Standard.

The starch equivalent (or food unit) values of fodder crops are used as a standard on which to compare the food value of the crops. To say that the starch equivalent of oat silage is 12, means that 100 lb. of oat silage, when fed to your cattle in conjunction with a maintenance ration, has a productive or fattening value equal to that of 12 lb. of starch.

Plate 1.
A Good Crop of Italian Sweet Sorghum.

Crop.	Season of Growth.	Yield in Tons per Acre (Green Material).	S.E. or Food Unit Value.	D.P. Percentage.	Yield per Acre.	
					Food Units.	D.P.
Oats	Winter	5	12	1·5	1,344	168
Field peas ..	Winter	5	12	3	1,344	336
Sudan grass ..	Summer ..	6–8	12	1·5	1,613–2,150	202–269
Maize and Sweet Sorghum ..	Summer ..	10–12	12	1	2,688–3,224	224–269

D.P. stands for digestible protein and denotes pounds of digestible protein in 100 lb. of material.

From the table you can see that, due to their higher yield per acre, maize and sorghum will provide your cows with approximately double the bulk and food value with almost equal protein when compared with other crops which can be grown for silage. In addition to this big advantage of maize and sorghum, you should remember that Queensland's summer rainfall is more reliable than its winter rain.

The inclusion of a legume, for example, cowpea, with your silage crop increases the protein value of the silage and at the same time helps to maintain your soil fertility.

The Quantity Needed.

As the recovery of usable silage varies with different silage systems you must allow for this in planning the crop yield necessary to conserve as silage. In conventional tower silos, it is reasonable to anticipate a recovery of 85 per cent. of the crop weight that was put into the silo. With good trench silage the recovery would be approximately 75 per cent. while with the stack silage only about 65 per cent. (or less) recovery would be expected.

Thus if you ensile 100 tons of green maize in a trench silo you could expect to obtain 75 tons of silage from it.

Silage is an excellent roughage feed, but unless it contains a fair proportion of protein-rich herbage it must be supplemented with a protein-rich concentrate if fed as the only source of roughage for milking cows. Fed at the rate of about 3-4 lb. silage per 100 lb. bodyweight it forms a very good supplement for feeding with pasture or hay.

When storing silage as a drought reserve, the aim should be to conserve ¾ ton per cow per month. Allowing for a 75 per cent. recovery of trench silage this will provide a daily ration of 42 lb. per cow.

Thus, for a herd of 50 milkers, 187½ tons of silage would be needed to feed for five months. An 18-acre crop of maize or sorghum will produce this amount for you.

As silage is low in protein you should supplement the daily silage ration with 1 lb. of meatmeal per cow.

To sum up, for your drought reserve silage, grow maize or sorghum and conserve ¾ ton per cow per month. A knowledge of local conditions will be the best guide regarding how many months' reserve is needed.

Farmer Produces Butter by the Ton

By J. H. SMITH, Dairy Officer, Cooroy.

From July 1, 1957, to February 28, 1958, Mr. M. W. Reeve's Imbil dairy farm produced 11½ tons of commercial butter.

This farm's production would be judged to be good in a normal season, but must be considered exceptional for the drought conditions the district has just experienced. The year 1957 was the driest for the Mary Valley district since 1902.

This figure represents 3.7 per cent. of the total quantity of butter manufactured for the same period by the Pomona Butter Factory, which Mr. Reeves supplies. The Pomona Butter Factory at present has 245 suppliers.

AMPLE FEED.

The factor responsible for this farm's production during this record dry year was a supply of top quality feed continuously through the drought.

At the commencement of the drought, Mr. Reeves had the following fodder reserves:—

5,000 bushels of maize;
3,000 bales of lucerne hay;
5 acres of cow cane.

These fodder reserves were backed up by 142 acres of improved pasture, 42 being under irrigation. Irrigation power costs for the year amounted to £356. Mr. Reeves applies an acre-inch of water to his pastures at a cost of 6s. The 42 acres of irrigated pastures supplied continuous grazing to the herd of 135 milkers right through the drought year. The herd received from one to two hours' grazing per day, depending on the feed available.

In addition to feed supplied from the irrigated pastures, the herd received the following concentrate ration per day—

4 lb. (approx.) of very finely crushed maize,
½ lb. of blood meal (75 per cent. protein).

Strip grazing of cow cane also took place daily.

Mr. Reeves estimates that each cow in 1957 consumed 27 bushels of maize.

During 1957, 65 acres of maize were harvested. This crop yielded 79 bushels per acre. With sound mechanisation and bulk handling, the maize crop was produced at a cost of £8 5s. per acre. This represents 2s. 1d. per bushel. This costing was done by the Bank of New South Wales.

Mr. Reeves contends that maize is the king of the grains and he has been feeding it for 10 years. The maize is regarded as a fodder crop only. No doubt the maize ration fed to the cows daily is an excellent supplement to the protein-rich irrigated pastures.

At the end of February, with the drought behind him, Mr. Reeves still had the following fodder in reserve:

1,800 bushels of maize;
2,000 bales of lucerne hay.

Mr. Reeves was able to keep his production near normal during this very dry year. The only extra costs involved were power for extra irrigation, which amounted to little, as cows have been fed irrigated pastures for the last four years.

These are....

Plate 1 (top).—Typical Milking Cow on Mr. Reeves's Farm at Imbil. Note how well the animal has withstood drought conditions. **Plate 2 (bottom).—Ladino Clover Leaf Taken from the Pasture in October, 1957.**

. . . . Drought Pictures!

Plate 3 (top).—Portion of the Milking Herd Returning to Grazing Paddocks.
Plate 4 (bottom).—Cows Grazing Irrigated Pastures. On Mr. Reeves's Imbil farm there are 42 acres under irrigation.

Insufficient feed is regarded by Mr. Reeves as the main factor causing lowered production. "I found this out in 1947," said Mr. Reeves. "It was then I decided to do something about it."

CONTINUOUS PRODUCTION.

A study of annual production records for the last 10 years shows the consistent improvement since that drought year:

	Commercial Butter.
1947-48	25,678 lb.
1948-49	27,340 lb.
1949-50	31,655 lb.
1950-51	29,680 lb.
1951-52	21,565 lb.
1952-53	35,982 lb.
1953-54	34,980 lb.
1954-55	42,547 lb.
1955-56	43,023 lb.
1956-57	40,590 lb.
8 months to 28-2-58	26,122 lb.

Irrigated pasture was introduced in 1954. The influence of this on production since then is very significant.

Production during 1951, a drought year, dropped considerably, but not so in 1957-58. The introduction of irrigated pastures has not only given increased production in good years but has maintained the high level of production in drought years.

Mr. Reeves is assisted in his very successful farming enterprise by his two sons, Keith and Bernard. They both think along the same lines as their father. They feel they have just started to get results. In the next few years they hope for even better production.

FEEDING FOR HIGH PRODUCTION.

The profit in feeding concentrates to maintain milk yields in the winter quota months depends on the amount fed and the method of feeding. Concentrate feeding should be restricted to freshly calved cows. These should also be the cows your production records point out as the best producers. Concentrate feeding should begin a month before calving at 2 lb. a day, and this amount should be increased to 6 lb. a day a week before calving. Meal with only 10 to 12 per cent. protein is required at this time. After calving, a suitable daily ration is 40 to 50 lb. of silage, or 20 lb. of silage and 8 lb. of lucerne hay for each cow, together with 4 lb. of concentrate for each gallon of milk the cow gives. This concentrate should contain 20 per cent. of protein.

—A. HUTCHINGS, Senior Cattle Husbandry Adviser.

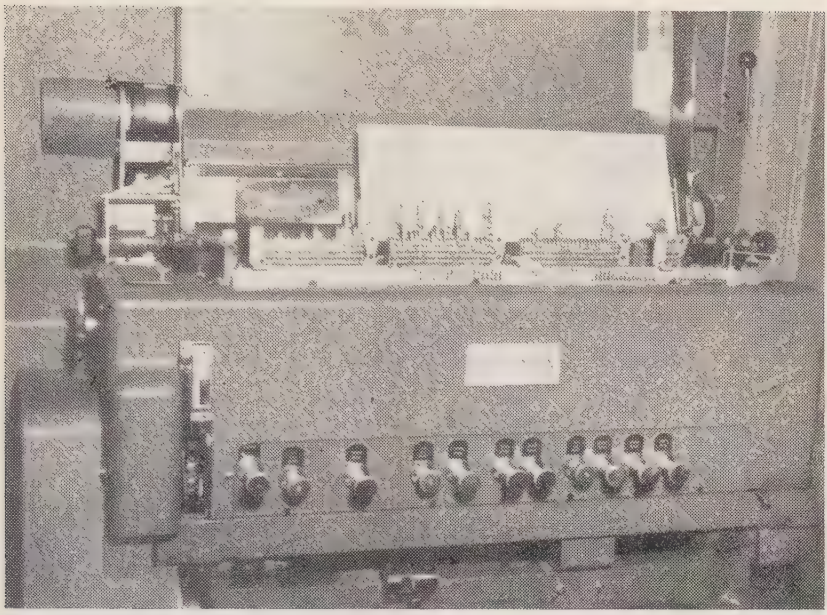


Plate 1.

Tabulating a Monthly Progressive Total Production Sheet.

Accounting Machines Aid The Dairyman

By C. H. CLARK, Dairy Adviser, Division of Dairying.

Machines have made it possible to compile records for 60,000 cows during the year with little extra staff than was required to handle records of 20,000 cows in 1949-50.

By doing this work, accounting machines have come to the aid of the dairy industry—at least they are helping those dairy farmers who are helping themselves by having their herds recorded.

Information provided now is much more comprehensive than previously. The records of individual cows are available to the farmers much sooner than before machines were used.

Progressive production figures enable farmers to compare, month by month, the records of cows which calve about the same time. Their attention is drawn quickly to fluctuations in any individual cow's production, and the cows with short lactations are pinpointed. The record of each cow's lactation is made known before she re-calves. This aids farmers in making decisions on culling and the selection of replacements. The records of the herd sire's daughters may be studied as soon as they complete their lactations, thus allowing the farmer to assess the value of his bull.

Plate 2.

Punching Information into Cards with the Automatic Key Punch.

The present system not only gives prompt information about individual cows, but also enables annual herd summaries to be forwarded a few weeks after the end of the herd recording year.

Early Group Recording.

Group recording for production of commercial dairy herds commenced in Queensland in January 1948. By September 30, 1949, 17,216 cows had been recorded in 507 herds. Herd recorders visited each farm for a 24-hour period every month and weighed the amount of milk produced by the individual cows in the herd. The butterfat content of the milk was determined by using the Babcock method of testing. Then herd recorders entered daily productions of milk, percentages of butterfat, and total butterfat on a sheet together with productions for a period of 30 days. When cows calved, information was sought initially concerning their breed, sire, dam, age, and date of calving.

In recent years more information has been obtained at the commencement and the completion of lactation periods. One copy of the monthly herd recorders' record sheet was given to the farmer, and the other copy was forwarded to a central office in Brisbane. Records for each cow were kept at this office by using a series of cards. During 1948-49 and 1949-50 this was done by hand.

Accounting Machines Used.

Interest in herd recording expanded and in 1949-50, 22,392 cows completed recorded lactations. It was soon evident that a large clerical staff would be required to handle records for individual cows. In an effort to keep costs at the lowest possible level, and to expedite the forwarding of information to farmers, mechanical aids were sought.

A suggestion that existing punched card accounting machines at the Government Statistician's office be used was investigated. It was decided to utilise this equipment, and in April 1950 that office commenced keeping the production records of individual cows.

During 1949-50 and 1950-51 the Statistician's office handled the monthly herd recorders' record sheets only. From these, the monthly production figures for each cow were examined and after the abnormal productions had been amended they were typed and forwarded to the owner. Following the installation of additional machines in 1951 the preparation of more information for farmers was done at the Government Statistician's office. The accounting machines also handled much of the work in the preparation of annual herd summaries at the end of the herd recording year.

At this stage, farmers were being advised of each cow's production only after her lactation had been completed.

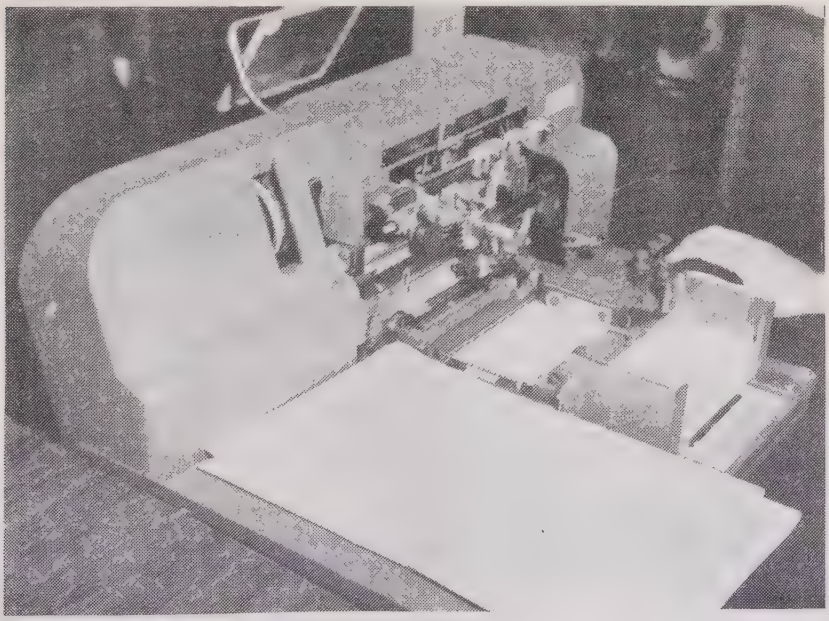


Plate 3.

Check-punching the Cards by Using the Automatic Key Punch in the Verify Position.

Plate 4.

Punching is Mechanically Checked on the Automatic Verifier.

At the end of each month accounting machines listed out for distribution the productions of all the cows which had gone dry during the month. The same procedure was adopted until 1957 when an additional tabulating machine with extra attachments was purchased. The system was then amended to provide improved services to members of the recording scheme. The most important change was the introduction of the "Progressive Total System". This enabled members to be supplied each month with the progressive production figure for each cow in their herds.

Punched Card System.

The accounting system makes use of punched cards. All information given on the herd recorders' record sheet is converted or "coded" to numerals, and then it is punched into the cards by girls who use mechanical punch machines. One card is punched for each cow every time she is recorded

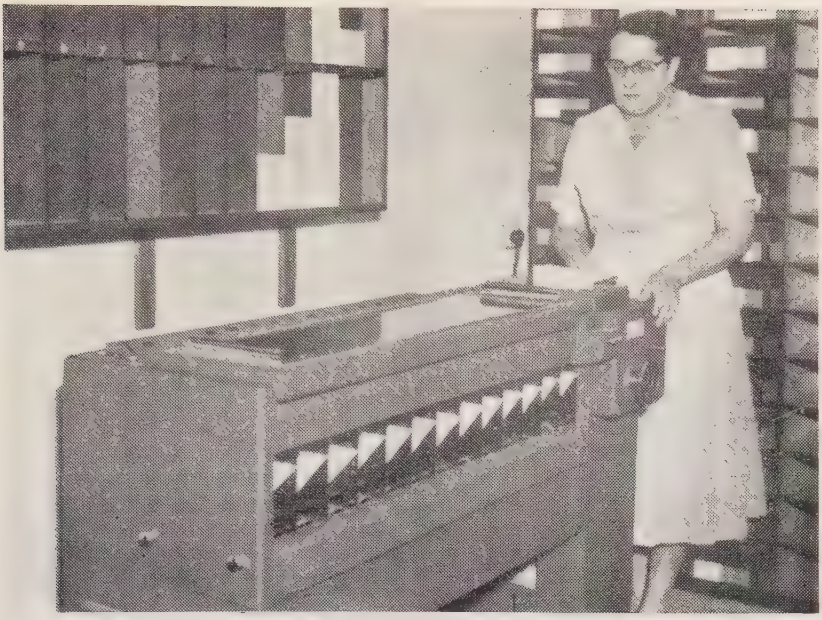


Plate 5.

The Sorter Rapidly Arranges the Punched Cards in the Required Sequence for Tabulating.

for production. Each card is divided into columns which are numbered from one to 65. They are designed so that a particular section of information is always placed in the same column.

Cards are punched at the rate of 200 per hour. Thus each operator of a punch machine handles the records of approximately 1,500 cows each day.

A check is made on the accuracy of the initial punching by a second operator who punches the same information on the original card. The first punching leaves round holes in the card, but for checking purposes the machine is set so that the holes are punched slightly lower during the second operation. Then after the second punching all the holes on the cards should be oval in shape. If an error has been made by either operator in any column of the card two round holes appear instead of one oval hole.

Errors made during the punching operations are located in the card by using a "Verifier". This machine (which is depicted in Plate 4) examines approximately 100 cards per minute, and automatically indicates the cards in which errors have been made. Incorrect cards are repunched and re-checked.

Sorting the Cards.

After the cards have been verified they are ready for sorting and tabulating. The "Sorter" which is shown in Plate 5 automatically arranges cards in any desired order or classification. This machine handles 600 cards a minute.

In herd recording work, where a progressive total production is required, two cards are used each month. One contains all particulars such as calving date and production totals from the previous tabulation, while the other card contains production figures for the current month. The cards for each herd are kept in separate bundles, and in each bundle the cards for individual cows are arranged in numerical order.

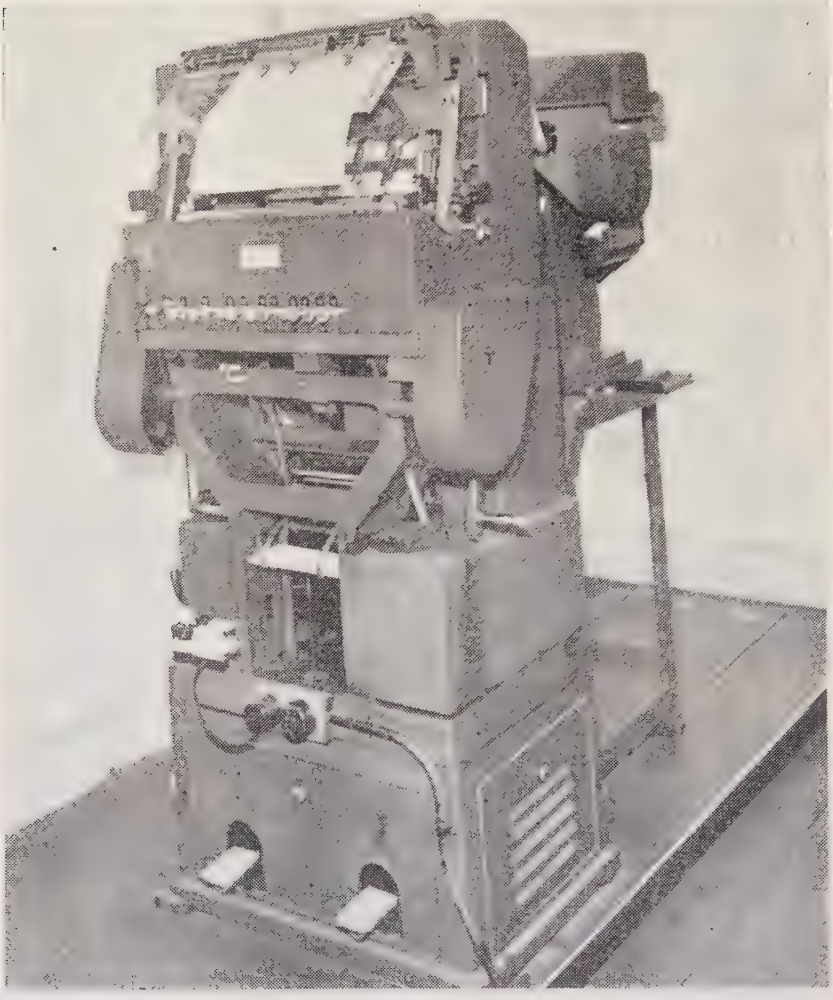


Plate 6.

The Tabulator is Equipped with a "Sheet Feed" Device for Quick Handling of Sheets. Attached to the tabulator is a summary card punch which automatically punches a summary card containing the information printed on the monthly progressive total production sheet.

The monthly cards are sorted, together with the summary cards which contain all the previous information. These two cards are placed in the "Tabulator". This machine totals the production figures from the two cards and prints them on a form which is then ready for dispatch to the farmer. Particulars of age and calving date of individual cows are also printed on the form. During this operation a new summary card for each cow, containing the production figures to date, is also punched by an attachment. These new summary cards are filed away according to herd number until the following month's recording figures have been prepared. Then the whole operation is repeated.

The Tabulator is shown in Plate 1. This machine handles cards at a maximum rate of 100 per minute. It may be set to list information which has been punched on individual cards, or it will add figures in specified columns and print a summarised report.

Other Uses for Cards.

The punched cards have other uses besides the compilation of progressive monthly production of individual cows. They are retained when cows complete their lactations, and used to prepare annual herd summaries. When a cow completes her lactation, a hole is punched in the "Exit" column of the last card. This information is carried through to the summary card, and after each tabulation the sorter removes all cards marked in the "Exit" column. These cards are stored until the end of the herd recording year. They are then listed on a form by the Tabulator. The average production for each age group in individual herds may then be calculated from the total productions tabulated.

Summary cards may also be used to compile information according to the punching of any column of the card. In recent years they have been used extensively to prepare information on the effects of month of calving and length of lactation on production. Investigations into various aspects of dairy herd management are also being carried out.

It is considered that by using accounting machines it has been possible to provide an excellent service to farmers in the State—a service equal to any in the world.

Acknowledgement.

Acknowledgement is made of the information supplied and the assistance given by Mr. G. R. Wagner, Supervisor of the Machine Section at the Government Statistician's Office, in the preparation of this article.

Strip + Spray = Winter Feed

A Combination of Strip Grazing and Spray Irrigation Ensures Plenty of Winter Feed.

Brucellosis-Tested Swine Herds

(As at 1st June, 1958.)

Berkshire.

A. P. and N. Beatty, "Deepdene," Barambah road, Nanango
S. Cochrane, "Stanroy" Stud, Felton
J. L. Handley, "Meadow Vale" Stud, Lockyer
O'Brien and Hickey, "Kildurham" Stud, Jandowae East
G. C. Traves, "Wynwood" Stud, Oakey
Westbrook Farm Home for Boys, Westbrook
H.M. State Farm, "Palen" Stud, Palen Creek
A. R. Ludwig and Sons, "Beau View" Stud, Beaudesert
D. T. Law, "Rossvill" Stud, Trouts road, Aspley
R. H. Crawley, "Rockthorpe" Stud, *via* Pittsworth
F. R. J. Cook, Middle Creek, Pomona
Mrs. I. M. James, "Kenmore" Stud, Cambooya
H. L. Stark, "Florida," Kalbar
J. H. N. Stoodley, "Stoodville," Ormiston
H.M. State Farm, Numinbah
G. L. Gabanko and R. H. Atkins, "Diamond Valley" Stud, Mooloolah
L. Puschmann, "Tayfeld" Stud, Taylor
C. E. Edwards, "Spring Valley" Stud, Kingaroy
V. F. Weier, "Sa Crescent," Clifton
N. Rosenberger, "Nevrose," Wyreema
B. Osborne and Dr. J. W. Best, Miltown Stud Piggery, Warwick
W. Young, Kybong, via Gympie
E. J. Clarke, Mt. Alford, *via* Boonah
G. McLennan, "Murcott" Stud, Willowvale
C. F. W. and B. A. Shellback, "Redvilla" Stud, Kingaroy
J. C. Lees, "Bridge View" Stud, Yandina
F. Thomas, "Rosevale" Stud, M.S. 373, Beaudesert
A. C. Fletcher, "Myola" Stud, Jimbour
Q.A.H.S. and College, Lawes
E. F. Smythe, "Grandmere" Stud, Manyung, Murgon
E. R. Kimber, Block 11, Mundubbera
A. J. Potter, "Woodlands," Inglewood
Regional Experiment Station, Hermitage
J. W. Bukowski, "Secreto" Stud, Oxley
R. Astbury, "Rangvilla," Pechey
L. Pick, Mulgildie
D. G. Grayson, Killarney
A. French, "Wilson Park," Pittsworth
D. Ludwig, Cainable, via Beaudesert
J. & S. Kahler, East Nanango

Large White.

H. J. Franke and Sons, "Delvue" Stud, Cawdor
Garrawin Stud Farm Pty. Ltd., 657 Sandgate road, Clayfield
J. A. Heading, "Highfields," Murgon
R. Postle, "Yarralla" Stud, Pittsworth
B. J. Jensen, "Bremerside" Stud, Rosevale, *via* Rosewood.
E. J. Bell, "Dorne" Stud, Chinchilla
L. C. Lobegeiger, "Bremer Valley" Stud, Moorang, *via* Rosewood.
H. R. Gibson, "Thistleton" Stud, Maleny
H.M. State Farm, Numinbah
V. P. McGoldrick, "Fairymeadow" Stud, Cooroy
S. T. Fowler, "Kenstan" Stud, Pittsworth
W. Zahnow, Rosevale, *via* Rosewood
Regional Experiment Station, Biloela
G. J. Hutton, "Grajea" Stud, Cabarlah
H. L. Larsen, "Oakway," Kingaroy
A. Palmer, "Remlap," Greenmount
G. I. Skyring, "Bellwood" Stud, *via* Pomona
G. Pampling, Watch Box road, Goomeri
M. Hall, "Milena" Stud, D'Aguilar
K. B. Jones, "Cefn" Stud, Pilton road, Clifton
O. B. Vidler, Manneum, Kingaroy
Barron Bros., "Chiltern Hill," Cooyar
K. F. Stumer, French's Creek, Boonah
Q.A.H.S. and College, Lawes
R. S. Powell, "Kybong" Stud, Kybong, *via* Gympie
C. Wharton, "Central Burnett" Stud, Gayndah
S. Jensen, Rosevale, *via* Rosewood
V. V. Radel, Coalstoun Lakes
H. R. Stanton, Tansey, *via* Goomeri
L. Stewart, Mulgowie, *via* Laidley
D. T. Law, "Rossvill" Stud, Trouts road, Aspley
O. J. Horton, "Manneum Brae" Stud, Manneum, Kingaroy
Dr. B. J. Butcher and A. J. Parnwell, 684 Logan road, Greenslopes, Brisbane
R. Kennard, Collar Stud, Warwick
A. C. H. Gibbons, Mt. Glorious
A. Kanowski, "Exton," Pechey
L. C. and E. Wieland, Lower Cressbrook
P. L. and M. T. D. Hansen, "Regal" Stud, Oaklands, Rangeville, Toowoomba.
P. F. Ives, Capalaba
D. Ludwig, Cainable, via Beaudesert
J. C. Lees, "Bridge View" Stud, Yandina
R. Rhodie, Clifton
C. Assenbruck, Mundubbera

Tamworth.

D. F. L. Skerman, "Waverley" Stud, Kaimkillenbun
A. C. Fletcher, "Myola" Stud, Jimbour
Salvation Army Home for Boys, "Canaan" Stud, Riverview
Department of Agriculture and Stock, Regional Experiment Station, Kairi
F. N. Hales, Kerry road, Beaudesert
T. A. Stephen, "Withcott," Helidon
W. F. Kajewski, "Glenroy" Stud, Glencoe
A. Herbst, "Hillbanside" Stud, Bahr Scrub, *via* Beenleigh
F. Thomas, "Rosevale" Stud, M.S. 373, Beaudesert
H. J. Armstrong, "Alhambra," Crownthorpe, Murgon
R. H. Coller, Tallegalla, *via* Rosewood
D. V. and P. V. Campbell, "Lawn Hill," Lamington
S. Kanowski, "Miecho" Stud, Pinelands
N. R. Potter, "Actonvale" Stud, Wellcamp
L. C. and E. Wieland, Lower Cressbrook

Wessex Saddleback.

W. S. Douglas, "Greylight" Stud, Goombungee
C. R. Smith, "Belton Park" Stud, Nara
D. T. Law, "Rossvill" Stud, Trouts road, Aspley
J. B. Dunlop, "Kurrawyn" Stud, Acacia road, Kuraby
M. Nielsen, "Cressbrook" Stud, Goomburra
G. J. Cooper, "Cedar Glen" Stud, Yarraman
"Wattledale" Stud, 492 Beenleigh road, Sunnybank
Kruger and Sons, "Greyhurst," Goombungee
A. Scott, "Wanstead" Stud, Grantham
G. C. Burnett, "Rathburnie," Linville
R. A. Collings, "Rutholme" Stud, Waterford

British Black.

E. Pointon, Goomburra

Beating Passion Vine Wilt

By H. M. GROSZMANN, Senior Plant Breeder,
and G. S. PURSS, Pathologist.

Grafting of the purple on to the golden passion vine is recommended as a means of overcoming the attack of Fusarium wilt on passion vine growing.

Fusarium wilt of the passion vine was first recognised in Queensland in 1941. For some time the disease was restricted in its distribution but in recent years it has spread more rapidly, and is now a serious hazard to passion vine growing in most parts of south-east Queensland

The disease results in wilting and death of plants at all stages of development. It is caused by a fungus (*Fusarium oxysporum* f. *passiflorae*) which enters the plants through the roots below ground level. The fungus appears capable of surviving in the soil for many years so that land once infected is, from then on, rendered useless for passion vine growing.

The only effective means of controlling a soilborne disease of this kind is by the use of resistant types of passion fruit. These could be resistant strains of the commercial purple passion fruit (*Passiflora edulis*) if any were available. Failing this, non-commercial varieties or even other species resistant to wilt might serve as rootstocks on which to graft the commercial vine or as sources of resistance which might be incorporated in the purple passion fruit by cross-breeding.

Low Resistance.

Most cultivated plants consist of numerous types or strains differing in many ways such as fruit size and shape, cropping capacity, and even resistance to various diseases. If any of the commercially acceptable strains of the purple passion fruit were found to be wilt resistant, this would be an immediate answer to the problem.

With this in mind, many types of the purple passion vine were collected and seedlings were inoculated with the disease under controlled conditions. It was found that while some were more resistant to Fusarium wilt than others, the resistance was of a low order and tended only to delay infection rather than prevent it.

In a perennial crop such as the passion fruit this resistance would be of little value.

In addition to testing strains of the purple passion fruit the search for resistance was extended to other varieties and species of the genus *Passiflora,* in the hope of finding a resistant type suitable for use as a rootstock.

In Victoria an introduced species (*P. caerulea*) is extensively used for this purpose but under Queensland conditions it has three distinct disadvantages. Virus disease may be more serious in the grafted plant while the rootstock itself suffers from a base rot and suckers far too freely.

From a collection of varieties grown at Redlands Experiment Station three strains of the golden passion vine (*P. edulis* f. *flavicarpa*) were selected because of their apparent ability to survive the disease when growing in infected soil, and their free fruiting

habit. As these types were closely related to the purple passion vine, grafting between the two could be expected to be easy. This was soon proved correct by a number of trial grafts.

When tested in the glasshouse all three strains showed very good resistance to Fusarium. In a subsequent experimental farm planting on infected soil, grafted plants with these strains as rootstocks survived while the purple passion vine on its own roots succumbed to wilt.

At the same time a series of grafts of the purple onto the golden passion vine were made by several methods to establish a practical technique which could easily be applied by the commercial grower. Two of these methods were well adapted to use with small seedling rootstocks, and numerous grafted vines have since been established in areas extending from Brisbane to Bundaberg where Fusarium wilt is prevalent. These have remained free from wilt through several cropping seasons, and their cropping capacity appears to be at least as good as that of healthy purple passion vines on their own roots. However it has been difficult to make direct comparisons as almost invariably the purple passion vines planted in the same soil died from wilt before reaching the cropping stage.

In view of the successful performance of this combination it appears that growers might well adopt the golden passion vine for use as a rootstock on a commercial scale.

It will first be necessary to obtain seed supplies, and in order that growers may recognise the resistant golden passion vine the following description is given:

The Golden Passion Fruit.

The golden passion fruit is grown widely throughout coastal Queensland, but has played little part in commercial production.

The vine is rather like that of the common purple variety, but generally more vigorous. The main stem, instead of being greenish, like that of the common variety, is purplish, as also is the young growth.

The flower is much like that of the purple passion fruit, but generally more vivid in colour. However, it sheds its pollen shortly before the flower opens, whereas in the purple variety, the pollen is not shed until some time after the flower has opened.

The fruit varies in shape and size, and is usually rather larger than the largest of the purple variety. It may be oval or spherical. It is covered with conspicuous small speckles which are lighter than the background colour, and, when ripe, the skin is yellow—not purple.

In flavour, the pulp is more acid than that of the purple variety and has a strong guava-like taste. The pulp is also more densely packed in the fruit, and the seed is brown, not black.

When different strains are grown together, fruit set is frequently better than when a vine is grown by itself, and this will have a bearing on seed production.

In southern Queensland the golden variety has not been observed in flower in September when flowering commences with the purple variety; flowering normally begins in December and may continue into May.

Should the flowering times of the purple and the golden varieties overlap they will cross readily. Where it is desired to establish stock vines for seed production this crossing must be avoided by isolation, as the susceptibility of the purple variety to wilt might be introduced to the stock.

There is another and rarer form of the commercial passion fruit which has yellow instead of purple fruit.

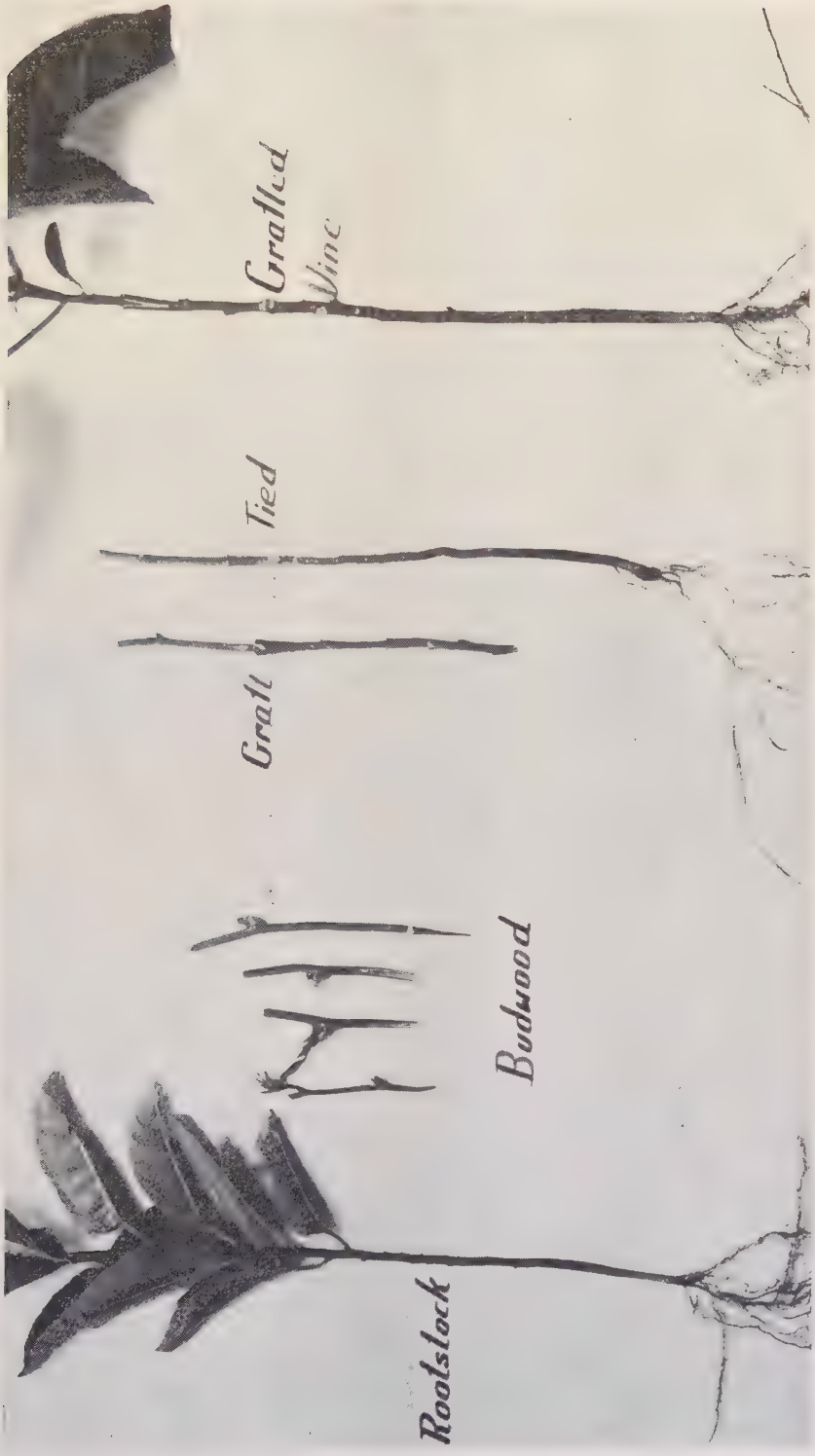


Plate 1.
Cleft Graft.

However it has white flowers and the fruit is not speckled. This should not be used as a stock.

Grafting Methods.

To make the graft, seedlings of the resistant rootstock are raised during the warmer months in the same manner as those of the common purple passion fruit. When these are about 9 to 12 in. high and a little more than $\frac{1}{8}$ in. in stem diameter, they are ready for grafting. Grafting can be done by a cleft graft or by an approach graft.

Cleft graft.

For cleft grafting the stock is cut off squarely about 6 in. above ground level and then split down the middle for about one inch with a fine sharp knife or a safety razor blade. A small piece of tip wood of the purple passion vine, about 2 in. long, is used as a scion. Its larger leaves are first removed, leaving just a small terminal shoot, and the bottom inch is then cut to a fine wedge. The wedge end of the scion is inserted in the cleft of the stock and the union is bound with thin polyvinyl plastic strip. In about two weeks the graft will have taken and the plastic binding can be removed. Any risk of wilting after the graft is made can be avoided by providing shade and protection from wind for about two days.

It is possible to dispense with the need for protection by cleft grafting, not with tip wood, but with scion pieces cut from slightly further back and from which the leaves have been removed leaving one or two buds. However, these will grow more slowly than scions which retain more foliage and are protected at critical times.

Approach graft.

The approach graft takes a little longer to do, but is very reliable and the grafted vine is ready for planting out somewhat sooner. To make this graft, seedlings of the golden passion vine rootstock and the purple passion vine scion are raised at the same time, allowing for some surplus.

When they are about 9 to 12 in. high, similar numbers of each are dug and placed in separate containers where they are kept moist. A plant of the rootstock is then matched for size with a plant of the scion variety. Starting at about 4 in. or higher up the stem, the golden passion vine rootstock is cut through upwards with a slanting cut about $1\frac{1}{2}$ to 2 in. long. At a height to match this, a shallow slice is cut from the stem of the purple passion vine seedling and the two cut surfaces are placed together and bound with a narrow plastic strip. After the graft is made, the combination should be replanted in a seedbed or pot. In two or three weeks the purple passion vine can be cut off below the graft. Any tendency to wilt at replanting or after the purple passion vine stem is cut can be reduced by watering the plant well and providing shade.

Care must be taken when planting out into the field to see that the graft union is kept well above ground level. Any suckering of the root stock from below the graft should be prevented by removing the buds or shoots in this region.

Using either the cleft or the approach graft, sufficient vines for an acre can be grafted in two or three days.

Avoid Woodiness Disease.

The woodiness virus is not normally transmitted through the seed so that seedlings are at least at first free from the woodiness disease. There is, however, a risk of introducing this disease when using scion tips from an older plant in which the virus may be present without showing itself.

Scion tips are best taken from purple passion vine seedlings raised specially for the purpose at the same

Plate 2.
Approach Graft.

time as the root stocks. The seed selected should be from good cropping healthy vines. The seed bed should be well away from established vines and not on soil which has any past history of passion vine wilt.

The use of budwood from numerous seedlings is a wise precaution with plants like the passion vine which are naturally freely cross pollinated. It is always possible with cross pollinated plants that some plants will set little fruit when the flowers are fertilized only with their own pollen; if all the budwood for a plantation were by chance taken from such a plant very poor crops would result.

Breeding Resistant Varieties.

As has been mentioned, the purple and golden passion vines will cross readily. However, they have rather different characteristics and the recombination of these could yield not only useful disease resistance, but also different fruiting seasons and quite possibly better cropping habits than the purple passion vine.

Several natural crosses have occurred in Queensland and progenies from such crosses have been studied. Normally, in the second hybrid generation they split up into numerous types. During the work on Fusarium resistance, one plant in the third hybrid generation of such a cross set heavy crops of large fruit. This fruit, however, tended towards the golden type. To improve fruit quality it has been crossed back to the purple passion. The progeny of this cross show good resistance on the farm to Fusarium wilt and produce fruit approaching the purple type. However, the type is not yet fixed, and work with this line is continuing in the hope of producing a variety or varieties which breed true for wilt resistance and desirable horticultural qualities. This will probably take several plant generations to complete.

The Department's Float in Brisbane's Labour Day Procession.

Soil Ripper Benefits Pineapple Crop

By K. KING, Senior Adviser in Horticulture.

Ripping opens up the soil, and usually improves subsurface drainage and soil aeration, both of which are very important to the pineapple crop.

Irrespective of whether the land is ploughed or disced, it is seldom ready for planting until the soil has been thoroughly ripped. This involves the use of a heavy implement with one or more rigid or spring tines which penetrate well into the subsoil. Its main functions are to fracture the subsoil and to break up any natural or induced hardpan that may be present below the surface.

Pineapples are grown on a wide range of soil types but only those which are well-drained can be expected to give consistently good results from year to year. Good drainage is a characteristic of soils which are open-textured to depth, but land with a shallow surface soil and a sticky clay subsoil or a hardpan less than 18 in. below the surface is invariably poorly drained and therefore not suitable for the crop.

Land is not necessarily well-drained because it is on the slope of a hill. On such slopes, surface water may get away quickly but irregularities in the subsoil frequently hold-up the movement of water within the soil and induce waterlogging after heavy rain.

Plate 1.

Pineapple Fruit Before Harvesting. If your crop is not like this, check your soil before replanting. Poor drainage may be your problem.

Plate 2.

Pineapples Recently Planted on the Contour. The fate of the crop depends largely on drainage. Ripping before planting is a method of opening-up hard-pan which blocks the movement of water through the soil.

Preparing Virgin Land.

Land selected for pineapple production may be grouped broadly into virgin land which has not been cultivated previously and still carries forest or scrub timbers, and replant land on which pineapples have been grown for several years.

Clearing the timber from virgin land before preparing the ground for planting pineapples is a costly operation. Bulldozers have to be used to remove the trees. Heavy rippers are then run through the ground, usually both lengthwise and across the area. Besides shattering the subsoil, the ripper tine brings to the surface any roots which are left behind after the timber is uprooted by the bulldozer and pushed to the side of the paddock.

The preparation of virgin land for cropping, though costly, can be done quickly. It is a straightforward job with few complications, and little trouble is normally encountered with the first planting of pineapples.

Preparing Replant Land.

Strictly speaking, the preparation of replant land for pineapples begins with the destruction of the previous pineapple crop some 12 to 18 months beforehand.

The disposal of the old pineapple area has always been a problem. The rotary hoe and the disc cultivator are normally used for this purpose but several treatments at intervals of two to three months are necessary to get the land in reasonable order for establishing the new crop. The latest development in this field is the rotary slasher, which was designed primarily for the destruction of sapling regrowth and dense stands of shrubby weeds. Recent demonstrations give the impression that this implement will be used extensively for breaking up old stands of pineapples in future.

Modern practice in pineapple-growing countries is to leave as much as possible of the disintegrating crop residues on the surface of the ground rather than turn them into the soil. Where this method of soil management is adopted, the disc cultivator and the

Plate 3.

The Ripper. An implement used for opening up the subsoil and improving drainage.

Plate 4.

The Chisel Plough. A useful substitute for the ripper. It does not penetrate more than 15 in. into the soil.

rotary slasher are, of course, preferred to the rotary hoe, which mixes the residues with the soil.

It has become accepted practice to grow at least one and preferably more green manure crops during the intercycle period as part of a re-conditioning programme before land is replanted with pineapples. Experiments carried out at the Maroochy Experiment Station have proved the soundness of this practice in maintaining crop yields at payable levels. Cover cropping is therefore an important part of the work involved in preparing old land for replanting.

Why Rip Replant Land?

Drainage troubles often develop on land which has been cultivated for several years. Soil structure is modified by the regular use of implements and, even in a soil which was originally well drained, an impervious layer may develop just below plough depth. The result is a plough pan or hardpan through which water moves slowly, if at all. Cultivation when the soil is too wet for efficient tillage may also lead to the formation of a hardpan.

When such a hardpan exists, it can be effectively opened up before planting pineapples by means of a ripper which breaks the compacted layer. Water can then percolate through the soil more freely during periods of heavy rain; drainage is improved, and the risk of waterlogging reduced.

When waterlogging occurs, all the available air-space in the soil is filled with water for long periods and the roots of the plants cannot function effectively owing to the lack of oxygen. The pineapple crop is very sensitive to waterlogging in the soil and, after continuous rain over several days, particularly in autumn and early winter, the root system may collapse and die. When this happens, the above-ground parts of the plant wilt.

Poor drainage also favours outbreaks of top rot, a disease which is sometimes responsible for considerable losses in the field. In addition, the activities of some useful soil micro-organisms such as those which convert complex nitrogenous compounds into simpler forms which are readily available to the plant are seriously curtailed and plant growth is retarded.

The shattering of the subsoil brought about by ripping increases the depth of soil which can be effectively occupied by the roots of the pineapple plant. The roots are then able to penetrate deeper and have access to nutrients which would otherwise be outside the root zone and therefore not available to the plant In areas where rainfall is light, the penetration and water-holding capacity of the soil are greatly increased by ripping.

Under an efficient system of soil management, cultivation should not bring any large amount of subsoil to the surface because of its detrimental effect on the structure of the soil. However, when surface soil and subsoil are mixed at low levels, as is the case during ripping operations, some benefit may be expected from the plant foods brought closer to the surface where the plant can use them.

How to Rip.

For the best results from ripping, it is essential that the compacted subsoil be dry enough to fracture easily. If the subsoil is moist when the ripper is used, the cutting tine merely slices through the clay without fracturing it, and ripping may be of little value.

Where possible, the ripper should travel some distance beyond the headland of the paddock on each run. This will ensure that drainage water in the tracks of the tine moves freely out of the area where pineapples are to be grown. Should water bank up at or near the headland, it will almost certainly cause trouble in the crop. Rippers should be operated in replant land both up and across the slope at intervals of 4 ft. between cuts.

Ripping is a tough job and to stand up to the work the ripper must be of heavy and rugged construction. The depth of operation depends largely on the power unit available but most of the single-tine rippers penetrate the soil up to 2 ft.

The chisel plough is a useful substitute for the ripper although the tine penetration is limited to about 15 in. However, as an implement to prepare land for pineapples, it has the advantage of leaving the surface rough and cloddy with a mulch on top. This characteristic not only increases water intake from light rains but lessens the risk of erosion from wind (in light textured soils) and heavy rains.

When the soil is naturally badly drained, ripping alone is unlikely to provide a complete remedy for water-logging. However, when faulty drainage is an aftermath of excessive and possibly inefficient cultivation, ripping can be expected to ease the position and therefore improve prospects for the following crop

● **Check your farm machinery for the solid work ahead.**

Plate 1.
Sheep Feeding on Mulga.

Feeding Sheep on Mulga

By S. L. EVERIST, Government Botanist, J. M. HARVEY, Biochemist, Animal Research Institute, and A. T. BELL, Director of Sheep Husbandry.

On the red-brown soils west of the Balonne River and northwards as far as the Gowan Range, mulga (Acacia aneura) is the most important reserve of fodder for sheep in dry times. For more than 70 years, mulga has been fed to sheep during every drought in this region.

Questions are often asked about the actual food value of mulga, the best way to handle it, what happens to it after it is cut down, and how to preserve mulga seedlings.

Since 1946, these matters have been studied in the field and in the laboratory. This article summarises our present knowledge of the subject.

FOOD VALUE.

What is the food value of mulga?

Chemical analysis (Table 1) and digestibility trials (Table 2) show that mulga is relatively rich in crude protein, low in energy-producing food, high in lime, and low in phosphorus.

It is known that a dry adult merino sheep can eat about 3 lb. of dry matter per day. This amount of dry mulga leaves supplies the sheep with about 4 lb. of energy food per week and about $\frac{3}{4}$ lb. of digestible protein. This amount of energy food (4 lb. per week) is just sufficient to maintain a sheep in drought condition grazing quietly in the paddock. The protein supplied is more than enough for a dry sheep. If, for any reason, the sheep eats less than 3 lb. of dry

TABLE 1.

ANALYSES OF QUEENSLAND MULGA HAVE GIVEN THE FOLLOWING FIGURES :
(Composition of Leaves of Edible Trees on a Moisture-Free Basis).

Fodder.	Crude Protein.	Fat.	Crude Fibre.	Ash.	Nitrogen-free Extract	Lime (CaO).	Phosphoric Acid (P_2O_5).
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Umbrella Mulga (*Acacia aneura*)	12·8	1·1	32·9	6·0	47·2	1·50	0·15
Whipstick Mulga (*Acacia aneura*)	13·4	2·2	27·9	5·0	51·5	..	..

TABLE 2.

RESULTS OF DIGESTIBILITY TRIALS, SHOWING DIGESTIBLE PROTEIN, AND STARCH EQUIVALENT (ENERGY FOOD) PER 100 LB. OF MOISTURE-FREE MATERIAL OF LEAVES OF MULGA.

Fodder.	Digestible Protein.	Starch Equivalent (Energy food).
	Lb.	Lb.
Umbrella Mulga	3·5	19·3
Whipstick Mulga	4·5	21·9

Plate 2.

Whipstick Mulga Which Died in 1946 Drought Because It Was Growing Too Thickly.

leaves *every* day, he may still get sufficient protein, but he *cannot* get enough energy from the feed. If energy is wasted on useless exercise, 3 lb. per day of dry leaves will not supply sufficient energy food.

Cutting should begin early, before the sheep become too low in condition. In order to conserve energy the sheep should not be called on to walk more than 1½ to 2 miles to water, unless they are feeding out and feeding back again. It is advisable to cut farthest away from water early in the drought, gradually working in towards the water as the drought progresses.

ALMOST COMPLETE FOOD.

Is mulga a complete food?

Almost! If the sheep eats 3 lb. every day, it gets sufficient energy food, digestible protein, and lime; but it cannot get enough phosphorus. This means that some phosphorus must be withdrawn from its bones. An adult sheep can withdraw phosphorus from its bones for a short period, but after some months the level of phosphorus in the blood falls. If it falls too far, the sheep's appetite is reduced.

We have already seen that in mulga feeding, the appetite must be maintained if the sheep is to remain in reasonable condition. For this reason, a lick high in phosphorus is necessary when feeding sheep on mulga. Bone flour is the cheapest of such licks.

There may be difficulty at first in getting sheep to eat bone flour, but this can usually be overcome by first feeding salt and then gradually increasing the bone flour content to about 50 per cent. If they still will not eat the bone flour/salt mixture, sprinkle the mixture with watery molasses. Once sheep are eating the lick readily, the amount of bone flour

Plate 3.

Umbrella Mulga Suitable for Lopping.

Plate 4.
Umbrella Mulga Suitable for Lopping.

needed is 500 lb. per thousand sheep per month. Field observations also indicate that the feeding of a salt lick in itself is beneficial unless the drinking water is saline.

KNOCKING IT DOWN.

What is the best way to knock down mulga?

You can use axe, fire (to burn through the trunk), bulldozer, tractor with pusher attachment, two tractors linked by chain or cable, or a "basher" towed by a tractor. The choice of method will depend on what kind of mulga you have and how much there is, the machinery and men available, the number of sheep you have to feed, the nature and accessibility of water facilities, and the nature of the country.

If mulga is scarce on your property, you will need to conserve what you have. In that case, unless it is whipstick or tall mulga, the axe is the best way to get it down. One good axeman working in good umbrella mulga, lopping all leaders and leaving laterals, should be able to keep 800 to 1,000 sheep well fed if he works 6 days a week. If you have more sheep and few men, a good "basher" or a front-end loader will feed the sheep without killing all your umbrella mulga.

If you have tall mulga or whipstick mulga, or if the scrubs are very dense, it is quicker and more economical to use machinery to knock it down, although you will waste some of the mulga. When pushing over tall mulga, be sure to leave a few to act as seed trees.

Where mulga is too dense—as it has been in many places since 1947—thinning out will benefit the country and the remaining mulga. If you have too many trees on an area, they use up soil moisture so rapidly that in a prolonged drought there is not enough water to go round and all are likely to die (Plate 2). By leaving fewer trees on the same area, you can ensure that those which remain will survive and produce good feed. It is advisable to leave at least 100 trees per acre.

WILL IT GROW AGAIN?

Will mulga grow again if you cut it?

That depends on the kind of mulga, the way you cut it, and seasonal conditions following lopping.

The only mulga which will grow again after lopping are trees of the type shown in Plates 3 and 4. These are sometimes called umbrella mulga. They branch fairly low and have two kinds of branches: *leaders,* which are stout branches sloping upward and

Plate 5.

Tall Mulga. If Cut Down or Knocked Down Will Die.

Plate 6.

Whipstick Mulga; Not Suitable for Lopping, Best Pushed Over with Machinery.

Plate 7.

Mulga Tree With Centre Removed, Leaving Laterals.

Plate 8.

Two Years' Regrowth of Mulga Which Was Cut at A, Above Lower Laterals. Note development of new leaders B.

outward, repeatedly forked and forming the main framework of the tree; and *laterals,* thin branches spreading out horizontally from the trunk and the lower part of the leaders and bearing short, leafy twigs.

Tall mulga and whipstick mulga, which have no laterals, will not grow again if you cut them down. (Plates 5 and 6.)

LOPPING.

How do you lop mulga?

If you want the tree to grow again, you must leave some laterals below the cut and above the reach of the sheep. To do this, you cut out all the leaders, that is, the whole centre of the tree (Plate 7). If you leave one leader and some laterals, the tree will grow lopsided; if you leave one leader and no laterals, growth is generally very poor. Trees with all the leaders removed and some laterals left usually replace their leaders

rapidly (Plate 8) and are ready to lop again in less than 10 years (Plate 9). One man in the Eulo district has lopped his mulga in this way seven times since 1902 and the trees are still good.

USING MACHINERY.

What machinery can be used?

The modern bulldozer does a good job if it has sufficient power to be driven steadily through the mulga without much backing off. A crawler tractor of about 50 to 55 h.p. is required if you are working in tall mulga or umbrella mulga. Smaller machines work well in whipstick mulga, but are time-wasting when bigger trees have to be treated. Bulldozing destroys most mulga.

During the 1944-46 drought, crawler tractors and bren gun carriers fitted with special frames were used. They were reasonably good but with light tractors there was much time wasted in backing off from the large trees. Two tractors linked by cable or chain can be used to feed large numbers of sheep in good mulga. If the cable is fitted with a jinker in the centre to keep the point of impact high, small trees are little damaged.

Large waggons fitted with heavy cross logs to act as bashers did good service in the 1944-46 drought and have several advantages. The one illustrated (Plate 10), built by Mr. John Borthwick of "Whynot," Quilpie, and towed by a 22 h.p. crawler tractor, was used to feed 6,000 sheep for six months working about three days a week. This machine broke off the leaders and did not damage the laterals. Regrowth has been so vigorous that now—11 years after treatment—the mulga is just as leafy as the original stand.

Plate 9.

Regrowth on Mulga 11 Years After Lopping. Note development of new leaders.

Plate 10.
"Borthwick Basher" for Knocking Down Mulga. The log is about 8 ft. above ground.

Recently at least one man has used a tractor fitted with a front-end-loader to push umbrella mulga. Properly handled, this machine will also knock off the leaders without destroying the laterals.

Power saws have been used to a limited extent. Chain saws are useful for knocking down tall mulga or umbrella mulga which is not required for regrowth, but for lopping they are no faster than an axe and much heavier to use. In big mulga, portable circular saws are useful for cutting down trees but not for lopping.

GROWTH FROM SEED.

Will mulga regenerate from seed?

Yes! Germination takes place mainly on bare ground when the soil is moist and the temperature high. Even in favourable seasons such as 1947, there was little or no germination under existing mulga trees but on bare areas seedlings came up in great abundance.

This is one reason why it is sometimes an advantage to clear old mulga or to thin out dense stands of mulga. By so doing you create conditions suitable for the development of a new generation of mulga. After germination, its survival depends on seasonal conditions and on protection from sheep and fire.

YOUNG MULGA.

Will sheep destroy young mulga?

Yes! Sheep eat young mulga. Mulga is difficult or impossible to re-establish from seed in country which is continuously stocked with sheep unless the rate of stocking is very light (Plate 11). In most mulga areas, horse paddocks are conspicuous by the amount of young mulga in them compared with areas stocked with sheep (Plate 12).

As yet, we have no definite information on the length of time you must keep sheep away from young mulga, but there are indications that it may

be necessary to shut up a paddock for five to six years to make sure the young mulga grows big enough to survive.

However, sheep seem to eat more mulga in the cooler and drier months than in the summer and it is usually possible to graze paddocks during the flush season without injuring the young mulga.

FIRE WARNING.

Does fire kill mulga?

Yes! Fire will kill small mulga trees and often large ones too. On larger trees, fire often kills the lower laterals and converts umbrella mulga into tall mulga. Fires in the Nebine and Warrego country in 1950 and 1951 destroyed thousands of acres of young mulga which germinated in 1947 and also wiped out many older trees. Many of these areas are now without any mulga at all and there is some doubt as to whether there are many viable seeds left in the soil. If all your old mulga is gone and you are depending on seedlings to grow into new scrubs, you must protect them from fire.

IMPORTANT POINTS IN CUTTING MULGA.

If you have umbrella mulga in limited amount:

1. Use an axe, Borthwick basher or front-end-loader—not a bulldozer.
2. Take the centre out of each tree and leave the thin side branches (laterals) intact.
3. After the drought breaks and seedlings appear, protect them from severe grazing for five years or more.
4. Protect your mulga country from fire.

If you have tall mulga in limited amount:

1. Knock it down with an axe, saw, or machinery, or burn through the trunk.

Plate 11.

Mulga-Box Country Ringbarked 1937 and Stocked Continuously With Sheep Since Then. There is grass in good seasons but no feed in dry seasons.

Plate 12.

Similar Country in Adjoining Paddock to That Shown in Plate 11, Displaying Regrowth of Mulga after 20 years' Grazing with Horses Only.

2. Leave at least 10 trees per acre to act as seed trees.
3. After drought breaks, protect new seedlings from severe grazing for five years or more.
4. Protect your mulga country from fire.

If you have dense mulga scrubs:

1. Knock down the trees with an axe, saw, bulldozer, or basher.
2. Leave at least 100 trees per acre.
3. Protect your mulga country from fire.

Let's Keep Pace With Pleuro

Don't neglect pleuro inoculation this year. The incidence of pleuro has fallen sharply in the last two years, largely as a result of extensive vaccination campaigns undertaken by property owners.

While this is good news, there's no cause for complacency. The disease is still present, even though its incidence is low. Any relaxation in herd vaccination programmes will allow the disease to build up again and a recurrence of the great outbreaks of the late 1940's could easily result.

Regular herd vaccination is the only way to prevent this. By vaccinating your young stock every year and your older cattle every two or three years, you'll keep the incidence of pleuro low, and get the greatest benefit from your vaccination programme.

—*D. F. MAHONEY, Divisional Veterinary Officer.*

Tick Fever Immunity

By O. H. BROOKS, Divisional Veterinary Officer, Rockhampton.

It is usually taken for granted that cattle reared in ticky areas are immune to tick fever. That this is not always so has come as a surprise to many who have lost odd animals or suffered losses following movements from one area to another.

Deaths from tick fever among cattle reared in ticky areas are rare, and are usually related to some abnormal condition, such as a prolonged dry spell when cattle have been tick-free from six months upwards.

Under conditions favouring the spread of ticks towards marginal country, cases of tick fever among previously clean cattle are not uncommon.

Calves reared among ticks usually develop an immunity with age. Graziers consider that a calf is safe while it is on its mother, and usually by weaning time it has developed an immunity to tick fever. However, heavy blood infections have been seen in calves.

Answers to a few questions on tick fever may help to explain the nature of this disease called, technically, *Piroplasmosis*.

WHAT CAUSES TICK FEVER?

Tick fever is caused by organisms transmitted by ticks. These organisms, known as blood protozoa, destroy red blood cells.

A fever indicates when the fight against the disease has reached its peak, and all the resistance mechanism has been called upon to maintain life; extra energy produces excess heat which is recorded as "a fever".

Is there more than one organism? Yes; there is more than one organism. However, cases are usually caused by one parasite known as *Babesia argentina*, which is to be found in all tick-infested parts of the State. If cattle develop tick fever immediately following movement from one tick area to another, then either they did not have any tick fever immunity before movement, or the strain of travelling has "lit up" an inapparent infection. The fever is often thought to be due to a different tick fever organism, but this is not so.

WHAT CAUSES "RED WATER" TO DEVELOP?

Red coloured urine is the result of excretion of haemoglobin from broken red cells. Haemoglobin is the red pigment of red cells which gives blood its characteristic colour.

In the early stages of the reaction, the haemoglobin can be broken down by the liver and so pass into the bile. However, when the destruction of red cells reaches a certain level, the liver cannot handle all of the excretion and therefore, the red colouring matter has to be excreted by the kidneys without change. Hence the "red urine". The more intense the red colour, that is "red water", the less chance the animal has of surviving.

Recovery, however, confers an immunity which will be maintained, providing the animal remains in constant contact with ticks.

WHAT DOES POST-MORTEM SHOW?

On post-mortem examination the following lesions are significant:

Spleen—The internal structure breaks down, becoming almost liquified and resembling strawberry jam. The whole organ is enlarged, frequently to double normal size.

Gall—The amount of bile becomes excessive, and, instead of being a green liquid, it becomes dark and tarry.

Kidneys—The kidneys become congested and appear darker than normal.

Jaundice—In some cases which remain alive for a few days excess bile passes into the blood stream from the liver and causes a yellowing of mucous membrane, connective tissue of muscles, and surfaces of internal organs.

Bladder—This is usually distended with a "port wine coloured" urine.

BREAK IN THE CYCLE.

What can cause a break in the cycle of "tick fever immunity"?

During a period of dormancy of ticks, during adverse seasons and winter, the passage of tick fever organisms from one animal to another may be broken. During this period the animal gradually loses its immunity. This loss varies considerably from animal to animal; bulls appear to lose it more rapidly than cows and steers. Deaths have followed within three months of vaccination.

During the period of dormancy, the life cycle of the tick stops at the egg or larval stage. Eggs can survive several months, and the larvae up to nine months. In the event of dormancy for long periods, the tick fever organism dies within the egg or larvae so that when favourable conditions return, the tick has lost its capacity to maintain immunity by passing on the organism. In other words, it has become "non-pathogenic".

Loss of immunity in cattle implies that the parasite has disappeared from the blood. Therefore, following a break in the tick fever cycle, when non-pathogenic ticks develop on an animal which has lost its immunity, no organisms are engorged with the blood. Susceptible cattle can live in the presence of non-pathogenic ticks indefinitely, until immune cattle or pathogenic ticks (carrying the organism from an immune animal) are introduced to start another cycle.

This happening can be compared with the role of the mosquito in transmitting malaria. If the mosquito sucks blood from a malaria carrier, then it can transmit the disease to a susceptible person. On the Queensland coast we have mosquitoes capable of carrying malaria but because of the absence of the malaria parasite this mosquito is harmless.

The length of time ticks can survive off the host animal is governed almost entirely by temperature and humidity. The minimum period of the parasitic stage on the host is 18½ days and the maximum period is 35 days.

CAN YOU TELL?

Can you tell if cattle are immune? Unfortunately the answer to this question is no! It is usual to assume that when cattle are reared in a ticky area, they are immune.

It is a common practice to vaccinate cattle following movement from marginal areas to ticky areas in order to challenge their immunity. Such cattle could have been tick-free long enough to lose immunity, or they may never have had contact with the tick fever organism, as it is common for ticks in marginal areas to be "non-pathogenic".

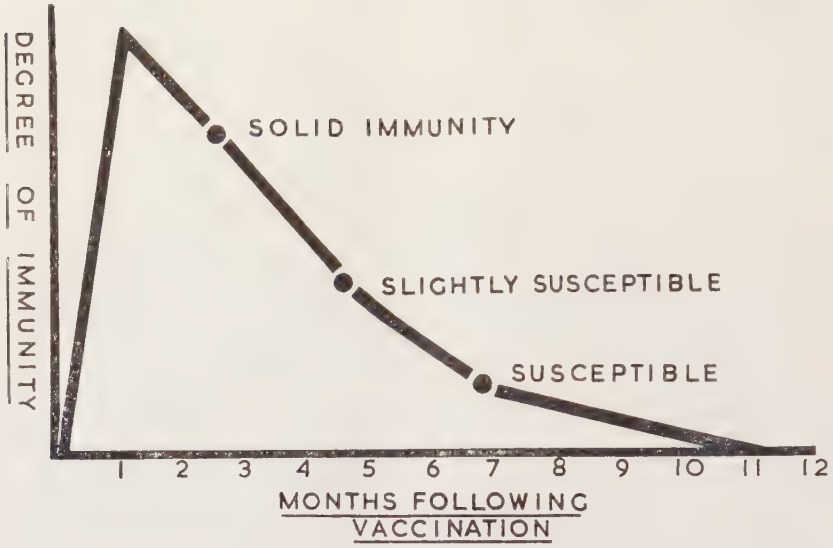


Plate 1.

Diagram to Illustrate How Immunity Is Lost If Cattle Are Kept Free of Ticks.

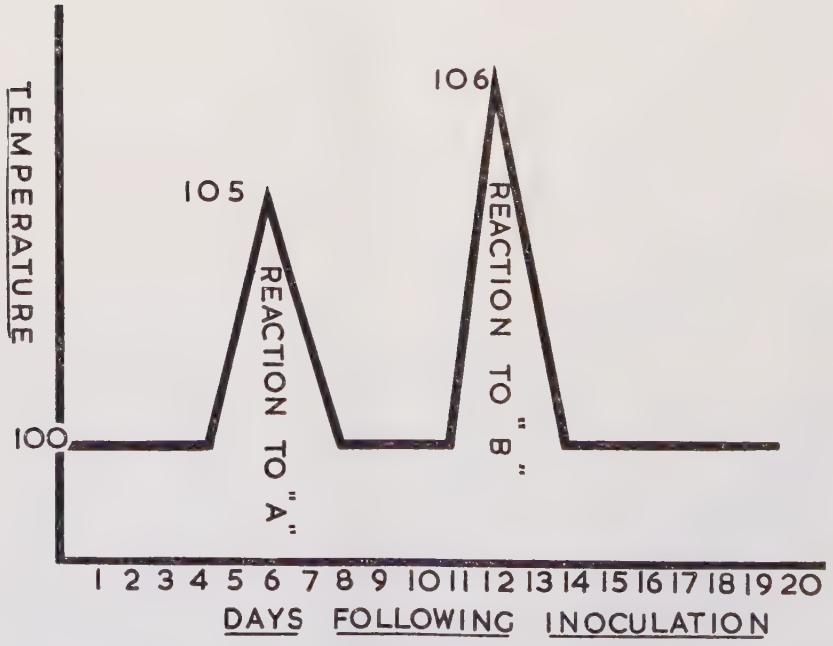


Plate 2.

Temperature Rises during Course of Reaction Following Vaccination with Blood from Bleeder.

IS IMMUNITY PERMANENT?

Is tick fever immunity permanent? If cattle remain in constant contact with ticks, they usually remain immune. They are always being invaded by organisms carried by ticks, and nature provides that the animal remains immune so long as contact is maintained with the hosts and parasites.

However, if immune cattle are removed from contact with ticks, or the tick population is suppressed by adverse seasonal conditions or efficient management, then the immunity can be lost in about six months (Plate 1).

USING A "BLEEDER" FOR IMMUNITY.

How does blood from a "bleeder" produce an immunity without causing serious losses? Bleeders carry two tick fever organisms which can be referred to, for the sake of simplicity, as A and B.

Both organisms are maintained at the Animal Research Institute in "carriers". Organism A causes a mild reaction in about seven to nine days. This reaction gives a partial resistance to the parasite B which causes most of the severe outbreaks.

The reaction to organism B takes place in about 14 to 18 days, when, under favourable conditions, the reaction is not very severe. However, odd cases may require treatment, more especially stud animals and bulls.

Innoculated cattle should be kept under observation during the reaction period.

Once a susceptible animal has reacted to A and B it can withstand invasion by pathogenic ticks and its immunity will remain, providing this contact is maintained or not broken by intervals longer than six months.

Hair Worms in Sheep and Cattle

Hair worms are becoming an increasingly serious problem to Queensland's sheep and cattle men. This parasite usually affects young sheep and cattle only in areas of high winter rainfall, but the wet winters in the mid-1950's have helped its spread. Recently, heavy infestations have been reported as far north as Hughenden and Townsville.

The hair worm is not important as a bloodsucker, but it causes scouring and loss of condition. It is recommended that phenothiazine drenches be used to control the worms.

May and August are the important months to drench for hair worm control. In worm control, however, a drench must never take the place of good management. Rotation of pastures and good feeding will do more to help the animals withstand internal parasites than repeated drenchings.

—K. M. GRANT, Assistant Director of Veterinary Services.

- **Do you know about pasture spelling and strategic dipping for tick control? If not, why not ask your nearest veterinary officer?**

These Cattle Feeding Troughs are Cheap

By D. S. STAPLETON, Cattle Husbandry Branch.

Effective troughs for feeding of stock in a paddock or yard have been made on the farm of Mr. W. Jannusch at Haden, northern Darling Downs. The troughs are particularly suited to the feeding out of silage.

Material costs of sufficient troughs for 30 cows should not exceed £12 10s.

Rejected drums were purchased from oil companies for about six shillings each. Used fence posts and 3 ft. x 2 ft. rejected mill timber comprised the framework. Construction is simple:

Forty-four gallon drums are cut lengthways along one side and the cut continued in order to halve both ends. The halves are folded along the uncut side to form two troughs. The folded drums are then set up in rows and supported by a timber frame-work.

Each animal is allowed to feed from a half drum. The timber framework at the ends of each drum provides a short partition between animals.

All sharp or jagged edges should be turned over to avoid injury to stock.

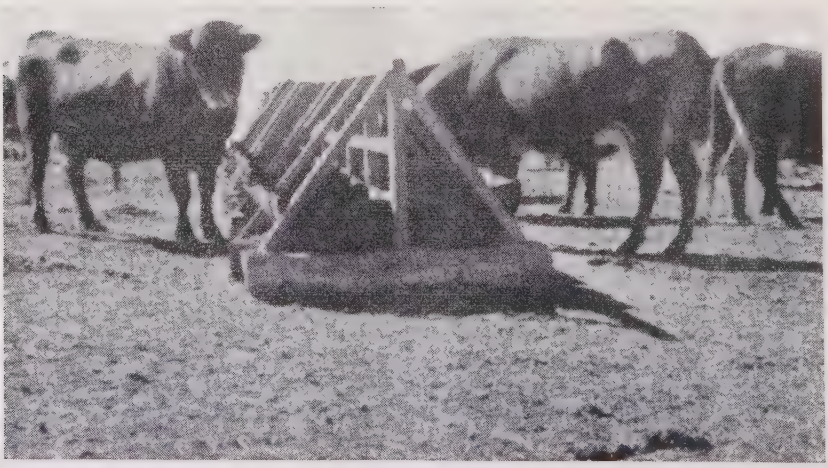


Plate 1.

Cattle Feed from Half-drums in This Effective Trough.

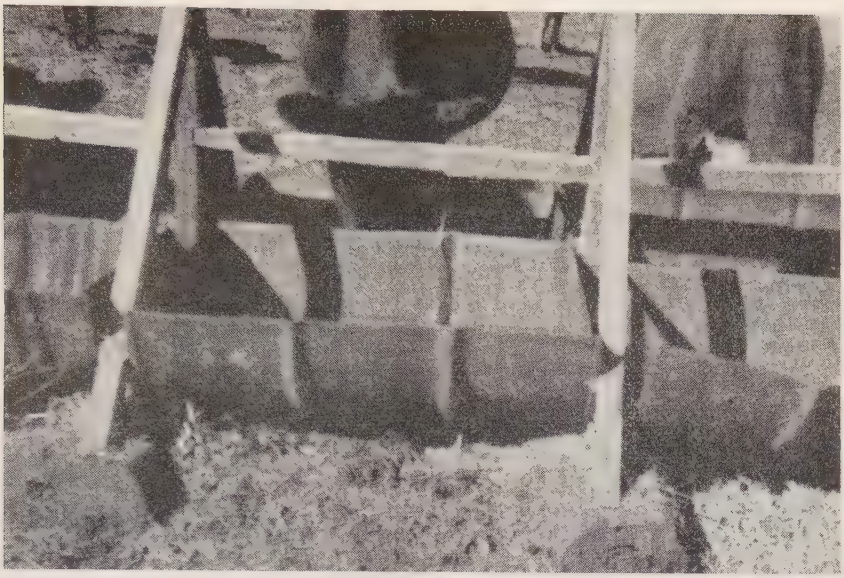


Plate 2.

Construction is Simple, Cheap, and Effective.

A Letter from Ballyrandoo

DEAR SON,

Thank you for your letter. Our neighbour J., the new selector you met just before you went away, came over for dinner yesterday. As you know, he was a cattleman and has just started with sheep. He brought over a front quarter of beef—very welcome as a change from mutton. I asked him if he knew a good way to make greenhide. According to him, you peg the dry hide out in the shade and if any salt on, sweep all the salt off. Then you cover the hide with ¼ in. of warm, unsalted fat. After letting the fat soak for a few days, you get an ordinary bar of kerosene soap and, using this as a brush, work it into the whole face of the hide vigorously. After the fat has been well worked in, fold the hide normally. A week to 10 days later, the hide will be ready for cutting into strips for ropes or other purposes.

J. wanted to know how to plan his series of sheep age marks and how long a series to use before repeating the first series. I told him we used five-year cycles; there is little chance of confusing six-year-old ewes with one-year-old. I showed him our ear-mark board in the office that we keep for easy reference; how we cut out a series of five life-size cardboard ears and put the age marks on with the actual pliers, and have the five ears one above the other in a five-year cycle. I told him we only use one pair of pliers, a notch, and the series: Full ear—Tip notch—front notch—double front notch—tip and front notch. You would probably have realised, having put them on so often, that this avoids using the back of the ear, so that the marks are less likely to be cut and distorted during shearing. I also told him to put all age-marks as close to the end of the ear as possible, to make for easy drafting when sheep are in full or nearly full wool. J. seemed grateful for the information.—Affectionately, DAD.

What Trees to Plant on the Downs

By P. J. HAWKINS, Forester, Queensland Department of Forestry.

In an endeavour to promote tree planting on the black soil plains of the Darling Downs, the Department of Forestry has established trial plantations over the past nine years.

These trials, held on the properties of Mr. F. K. Thomas, Brookstead, and Mr. C. L. Glanville, Tipton, have had as their object the determining of species most suited to these areas.

To date, out of some 100 species tried, results have been most encouraging.

Although a certain amount of tree growth occurs on surrounding areas, and also in pockets throughout the black soil plains, there are large expanses which are naturally treeless, due principally to adverse soil and climatic conditions. It is evident that many farmers on these areas have attempted to establish trees on their properties, particularly since the closer settlement which followed World War II.

However, results generally have not been good, and in many cases failure has been due to wrong establishment methods and the use of the wrong species.

There are also numerous farms on which no attempt has been made to introduce trees, and in these cases it must be assumed that the benefits to be derived from tree growth on agricultural areas are not fully realized. These may be summed up briefly, as follows:—

(i.) Trees act as a soil binder and generally as a soil improver. In this manner they provide the best means of combating erosion which may be due either to rain, wind, or water action.

(ii.) Trees hinder the free action of the wind, thus conserving moisture by the reduction of evaporation. Reduced wind action results in increased protection for crops and stock on agricultural lands.

(iii.) Trees help to equalize climatic extremes.

It is not proposed here to discuss in detail the advantages and disadvantages of tree growth to farm life, nor is it desired to present the detailed results of the trials at Brookstead and Tipton. Rather a short review of the various types of farm plantings, together with establishment techniques and recommended species will be dealt with.

1. ESTABLISHMENT TECHNIQUE.

On black soil areas the critical period in a tree's life is the first year, and a little extra care and attention then may mean the difference between survival and ultimate death. In the establishment of any planting scheme the following general pattern should be followed:

(*a*) *Fencing.*—All areas should be fenced to provide complete protection from stock in the early stages.

(*b*) *Cultivation.*—It has been found that it is useless to attempt tree planting unless cultivation is carried out. This is necessary to maintain the area free from weed competition, and to conserve moisture in the upper levels of the soil. Cultivation also helps to prevent the development of large cracks in the soil, thus reducing breakage of surface roots during dry weather. In general, cultivation in a manner similar to that used in grain crop production is recommended. New ground should be broken up a year before planting and given two or three cultivations. Further cultivation must be carried out at regular intervals after planting to keep weed growth to a minimum.

(*c*) *Planting.*—For frost susceptible species planting should be carried out during the spring months, with watering at the rate of one gallon per tree at planting, and afterwards as necessitated by weather conditions. For frost-hardy species, or on areas where watering is not practicable, planting should be carried out during the late summer and early autumn months. Planting should be done when the ground is in a moist condition following rain, and tubed stock (seedlings supplied in tubes) is recommended. When using tubed stock the following planting hints are given:

(i.) Give all plants a thorough soaking on the day prior to planting.

(ii.) With a mattock dig a hole slightly deeper than the length of the tube.

(iii.) Unclip the tube and place in the hole, packing moist soil loosely around the tube to hold it in place.

(iv.) Remove tube, packing the soil tightly around the tree roots to ensure that no air pockets are left.

Plate 1.

Four-year-old Athel Trees (Tamarix aphylla) Growing in Black Soil on Mr. C. L. Glanville's Property at Tipton Have Reached a Height of Approximately 20 ft. Sheep, which have eaten off the lower branches to an even height, are crowded underneath for shade.

(v.) Firm the plant on all sides with the heel leaving a small depression to catch any surface run-off.

(*d*) *Refilling.*—Should deaths occur in the original planting, refilling should be carried out within one year. Refilling in older areas is generally not successful owing to intense competition from trees for moisture and light.

2. FARM PLANTINGS AND SPECIES.

On the Darling Downs, tree planting will be carried out in a variety of ways, and before any scheme is embarked upon, the ultimate aim must be considered. The more important types are discussed:

(*a*) *Windbreaks or Shelterbelts.*—The chief function of windbreaks and shelterbelts is to reduce the force of the wind, and the major advantages are:—

(i.) They minimise soil erosion and the removal of the top soil which occurs if wind movement is unrestricted.

(ii.) They help to conserve soil moisture on crop and pasture areas, by reducing wind velocity and thus evaporation.

(iii.) They provide shelter for crops and stock.

(iv.) They protect farm buildings and add to the personal comfort of the inhabitants.

(v.) They can be maintained to provide a source of timber requirements, especially fuel and fencing material.

The main disadvantages are:—

(i.) They generally occupy a fair amount of land which reduces the effective agricultural acreage.

(ii.) They provide competition for moisture, light and soil nutrients between the tree growth and adjoining crops or pasture land.

The prejudice against using valuable agricultural land for the planting of trees when the resultant benefits are doubtful has probably been the main factor in preventing windbreak plantings in the past. Although there is some conflict among workers as to the extent of protection given by a windbreak it can generally be assumed that the zone of protection, measured in terms of wind reduction is in the vicinity of 15 to 20 times the height of the break.

The amount of land lost by competition with the windbreak, although variable with species, could be possibly equal to a narrow strip, equal to the height of the break.

The question must then be resolved as to whether the added protection given by a windbreak will pay for the loss of crop yields in the zone of competition.

Although no local studies on these points have yet been made, data from overseas workers rather uniformly point to increased yields on protected, as against unprotected areas. It has also been recommended by European agricultural economists that 20 per cent. of a farm should be in forest, and that such windbreaks, by protection alone will pay for the rental on the ground they occupy, equal to that from grain crops.

In any windbreak design it is essential that the wall of trees is wind resistant in itself, and that foliage should come down to ground level. In practice the width will depend on the amount of ground available on the individual farm and may vary from a single row to up to 3 or 4 chains wide.

For numerous reasons the single row belt is undesirable, and allowing for the high value of land in black soil areas it is recommended that a 5-row belt with hip-roof design is the most suitable for use in this district.

The basic layout in any design should consist of:

(i.) A small shrub which will retain its foliage to ground-level thus preventing the wind from moving through or under the break.

(ii.) A medium-sized tree, with rounded crown to provide a cushion effect to the wind.

(iii.) A tall growing tree with fairly dense upper crown to supply the height for the break.

On this basis a windbreak of any number of rows may be designed. All breaks should be planted at right angles to the prevailing wind, or to the winds causing greatest damage, and if gaps have to be made for the access of farm machinery these should be made at an angle. A spacing of 12 ft. x 12 ft. (302 trees/acre) in staggered rows is recommended. This will allow sufficient room for cutivation, and provides a fairly quick crown cover.

The following species, listed in order of preference, are recommended for windbreak planting on black soil areas:—

A. Low Trees or Shrubs to 20 ft.

Ligustrum lucidum	Tree Privet
Olea europea	Olive Tree
Tamarix aphylla	Athel Tree (unpruned)
Eucalyptus lansdowneana	Crimson Mallee Box

B. Medium-sized Trees—20 ft. to 50 ft.

(i.) *Evergreen—*

Acacia pendula	Weeping Myall
Acacia homalophylla	Yarran
Schinus molle	Pepperina
Eucalyptus orgadophila	Mountain Coolibah
Eucalyptus pilligaensis	Molly Box
Eucalyptus melliodora	Yellow Box
Tamarix aphylla	Athel Tree (Pruned)
Acacia stenophylla	Fragrant Myall

Plate 2.

This Plantation of Weeping Myall (Acacia pendula) is Growing on Red Soil at Tipton. The four-year-old trees are 15 ft. high. Sheep have eaten off the lower branches to an even height.

Plate 3.

Chinese Privet (Ligustrum lucidum) Has Been Planted for a Windbreak Behind the House on Mr. F. K. Thomas's Property at Brookstead.

(ii.) *Deciduous*—

Celtis sinensis	Chinese Celtis

C. Large Trees—Over 50 ft.

Eucalyptus sideroxylon	Mugga Ironbark
Eucalyptus camaldulensis	River Red Gum
Casuarina cunninghamiana	River Oak
Casuarina Cristata	Belah
Brachychiton populneum	Kurrajong
Eucalyptus hemiphloia	Grey Box
Eucalyptus microcarpa	Green-leaved Box
Eucalyptus populnea	Poplar Box
Pinus halepensis	Aleppo Pine
Pinus longifolia	Chir Pine
Eucalyptus maculosa	Red Spotted Gum
Eucalyptus blakelyi	Blakely's Red Gum
Pinus canariensis	Canary Island Pine

(*b*) *Woodlots.*

On most properties on the Darling Downs timber requirements have to be carted long distances and woodlot plantings to provide at least fencing and fuel requirements would be a great saving to the farmer. Although there may not be any immediate return to the farmer, such plantings will at least provide a valuable asset for his future generations. In most cases the farm woodlot will be incorporated with windbreak plantings, with the inner rows planted with species of timber value. However, if separate plantings are desired the planting of wide compact blocks is preferable to the long narrow form of windbreak plantings. In wide blocks forest conditions are more easily promoted, and fencing is kept to a minimum. A spacing of

9ft. x 9ft. (537 trees/acre) is recommended where early thinnings in the form of firewood and small fencing timbers are required, but if there is no use for small sized timber, wider spacings up to 12 ft. x 12 ft. are more desirable.

The following species, listed in order of preference, are recommended for woodlot planting:

A. Sawlog and Pole Production.

(i.) *Hardwoods*—

Eucalyptus camaldulensis	River Red Gum
Eucalyptus sideroxylon	Mugga Ironbark
Eucalyptus crebra	Narrow Leaf Ironbark
Eucalyptus hemiphloia	Grey Box
Eucalyptus microcarpa	Green-leaved Box
Tamarix aphylla	Athel Tree (if form-pruned)

(ii.) *Softwoods*—

Pinus longifolia	Chir Pine
Pinus canariensis	Canary Island Pine
Pinus halepensis	Aleppo Pine

B. Small Poles, Posts and Fencing Requirements.

The hardwoods listed above, plus the following species:—

Eucalyptus salubris	Gimlet Gum
Eucalyptus ochrophloia	Napunyah
Eucalyptus pilligaensis	Molly Box
Eucalyptus blakelyi	Blakely's Red Gum
Casuarina Cristata	Belah
Acacia homalophylla	Yarran

C. Fuel.

Almost all the species previously recommended, with preference being given to the Box and Ironbark group of Eucalypts, and Casuarina species.

(c) Ornamental, Garden and Hedge Plantings.

Ornamental and garden plantings are of greatest value in enhancing the beauty of a property and homestead, as well as adding to the personal comfort of the inhabitants. Trees make a place more attractive to live in, and on the flat treeless black soil plains they take away the dreariness of a rather monotonous countryside.

During the course of this Department's trials on black soil areas, a number of species have emerged which, although unsatisfactory for larger plantings on the open plains, can be successfully established in garden plantings where some measure of added protection and care can be given. The following highly ornamental species are recommended for particular purpose plantings only, but must be regarded as being supplementary to the more outstanding species previously recommended:—

A. Frost susceptible species—need early protection.

(i.) *Producing abundant, and attractive flowers*—

Schinus terebinthifolius	Broad-leafed Pepperina
Bauhinia hookeri	Pegunny
Grevillea robusta	Silky Oak
Erythrina cristagalli	Cristagalli
Thevetia peruviana	Golden Oleander
Eucalyptus torquata	Coral Gum
Eucalyptus grossa	Coarse-flowered Mallee

Plate 4.

A 27-acre Plantation of Athel Trees (Tamarix aphylla) on Black Soil at Pirrinuan. These trees were planted from cuttings in August, 1954, at 9 ft. by 9 ft. spacings. About 14,000 cuttings were used. The trees were pruned to one leader during the 1955 winter, and are about 12 or 13 ft. high. Two rows of trees on the left are from an earlier windbreak planting and are about five years old.

(ii.) *Others*—

Ceratonia siliqua	Carob Bean
Geijera parviflora	Wilga
Eucalyptus citriodora	Lemon-scented Gum
Eucalyptus cladocalyx	Sugar Gum

B. Other Flowering Species—Generally suitable.

Eucalyptus sideroxylon	Mugga Ironbark
Melia dubia	White Cedar
Tamarix gallica	Flowering Cypress
Eucalyptus lansdowneana	Crimson Mallee Box
Lagunaria patersoni	Norfolk Island Hibiscus

C. Suitable for Hedges and Low Shelters.

Ligustrum lucidum	Tree Privet
Olea europea	Olive
Tamarix aphylla	Athel Tree
Ceratonia siliqua	Carob Bean

For Services Rendered

By D. R. LEWIS, Division of Marketing.

Marketing boards are a prominent feature of the Queensland agricultural scene; they are accepted as necessary and vital by the majority of growers. Marketing boards are nothing more nor less than a form of co-operative association; a form, however, in which there is an element of compulsion.

Marketing boards are instrumental in maintaining quality standards, thus protecting the consumer and ensuring continuing demand for the growers' product. The Egg Marketing Boards with their candling staff, and the Peanut Marketing Board with its shelling and grading plant at Kingaroy, provide this service.

The Butter Marketing Board provides a valuable service in its production of ghee, butter concentrate and butter oil. It thereby provides further outlets for the disposal of butterfat.

Growers' organisations provide goods and equipment to the grower cheaper than he would be able to buy them elsewhere. For instance, the C.O.D sells fertilizers; the Butter Board manufactures refrigerators; the Egg Boards provide egg boxes on deposit, the Cotton Board hires out cotton picking machines.

Another type of service is that of crop insurance. The Tobacco Marketing Board arranges comprehensive cover on tobacco grown in Queensland from the time it is placed in the curing barns until its sale.

Plate 1.

Installations for the Bulk Loading of Sugar at Mackay Harbour.

—Queensland Cane Growers' Council photo.

GROWERS' LOYALTY SOUGHT.

What do the boards ask in exchange? All they ask is something which every grower can give—loyal support.

Marketing boards are set up at the wish of the majority of growers in an industry. They are set up for the benefit of all growers in that industry. To make growers' returns as high as possible boards have of necessity to provide many services.

In the first place it is usually necessary to have storage and handling facilities. It would be most uneconomic for growers to provide their own facilities and to sell their produce from many scattered dumps. The boards provide central storage facilities, thus reducing unnecessary handling and selling charges—facilities such as those provided by the State Wheat Board and the Barley Marketing Board on the Downs.

BULK HANDLING.

Where exports play a big part in the disposal of the crop then efficiency in handling at port is of great importance. Such a challenge is being met at Pinkenba where the State Wheat Board is erecting bulk handling and storage facilities, and at Mackay where the bulk sugar facilities have recently commenced operating. This new system enables a 10,000 ton cargo of raw sugar to be loaded in two days, whereas previously it took up to a month.

Crops produced by growers may need treatment before being marketed. Such treatment enhances the value of the crop. Where such processing is done by growers themselves, through their organisation, no processing costs are paid to third parties. Furthermore, any by-products remain the property of the growers and can be disposed of in their name and for their benefit. One example is the Cotton Marketing Board with its cotton ginneries and its oilseed crushing plant.

Marketing boards help to even out rises and falls in prices, which are as unsettling to the grower as to the consumer. Long term security is preferable to transitory, quick returns.

When you, a grower, are asked "Do you support your Board?" can you answer "Yes, I do, for services rendered."?

New Strain of Veldt Grass

"P.M.," of Dirranbandi, has written seeking information regarding veldt grass which he says is showing some signs of good development there.

Answer: The results of trials carried out previously with veldt grass were not sufficiently encouraging to warrant the publishing of a pamphlet on this grass. It is felt, however, that the grass could be of some value on poor sandy country where the areas concerned are subject to winter rainfall. This fact, combined with the run of good seasons prior to "P.M.'s" inquiry, may have contributed to the favourable impressions arising from the plantings he mentions.

In Western Australia, areas of poor country are being stabilised with veldt grass. However, it is said there that this grass is liable to disappear rapidly when grazed. It seems that the habit of developing the crown well above ground makes it very vulnerable to damage.

Latest advice is that a new strain of veldt grass is on the market, and this may offer some improvement over the type that was previously available.

Careers for Country Boys and Girls

No. 5—"Gatton" Diploma Courses

By E. T. HOCKINGS, Editor of Publications.

A large number of those who are working under blue skies, shoulder to shoulder with farmers, helping them with problems of agriculture, animal husbandry, dairying, and horticulture, are men who learnt their work in the first place at the Queensland Agricultural College at Lawes, near Gatton.

This, the final article in the series, tells of training at the College, and relates how the schooling there, both technical and practical, equips young Queenslanders to go on to interesting careers closely connected with the land.

THE WORK.

The Principal of the College, Mr. N. W. Briton, points out that the chief aim of the diploma courses at "Gatton" is to train men adequately for direct employment on the land, preferably as owner-managers of properties. The students are thoroughly prepared for successful management of stations, mixed farms, irrigation farms, dairy, wheat, pig, and poultry farms and orchards. The diploma course in dairy manufactures prepares students for employment in dairy factories, milk depots and milk processing establishments.

After completion of such a wide training as received in the diploma courses, it is not surprising to find successful students occupying positions in rural, technical and commercial fields.

Many students return to their homes to engage in rural pursuits, some enter State and Commonwealth Departments undertaking extension activities, others may enter commercial fields as technical officers of firms catering for farm and station requirements, whilst those undertaking further training figure prominently in many fields of research.

THE TRAINING.

The college is divided into two main sections—(*a*) Junior and (*b*) Diploma sections.

Junior instruction is provided in an attached Agricultural High School for boys having reached Scholarship standard. During the two-year course, as well as completing subjects of the normal Junior, students are given theoretical and practical instruction in agriculture and animal husbandry. On completing the course a large number of students enter on the diploma courses.

As the total applications each year exceed the accommodation available, enrolments in the junior agricultural high school section must be severely limited in order to ensure that all applications may be accepted from persons qualified and willing to go on to a diploma course. Enrolments in the high school section are now strictly limited to country boys resident in

Plate 1.

Portion of the Southdown Stud Flock at Queensland Agricultural High School and College, Lawes.

areas where they are unable to attend a high school without undue difficulty.

The diploma courses give advanced technical training in the rural fields. The provision of these courses is the prime educational function of the college.

The courses are open to students with a minimum standard of general education of an "approved" pass in the Junior Public Examination of Queensland or its equivalent. The Queensland Government has also agreed to accept an annual quota of students from other Australian States and overseas.

Students gaining "Open Entrance" Commonwealth scholarships from the Senior Examination may take out their scholarships in the diploma courses.

May Go On To University.

A pass in the diploma examinations entitles a student to matriculation in the University of Queensland to undertake degree courses in Agricultural Science, Veterinary Science, Forestry and Commerce.

The diploma courses cover three years, during which time students complete two years' basic training, specialising in their selected fields in the third year.

The four diploma courses available are Agriculture, Animal Husbandry, Dairy Manufactures and Horticulture.

Main subjects of study are:

First Year.—A year devoted to the study of basic science and to practical work, covering a wide range of farm work to ensure a satisfactory background for later and more advanced technical training.

Lectures comprise English I, Agricultural Chemistry I, Agriculture I, Animal Husbandry I, Agricultural Engineering I, and Rural Economics I.

Second Year.—This year includes a considerable diversity of technical topics.

Lectures comprise English II, Agricultural Chemistry II, Agriculture II, Animal Husbandry II, Agricultural Engineering II, Rural Economics II.

Third Year.—A year of specialisation. Lectures and practical instruction is restricted to 25 teaching weeks. The balance of the time is devoted to tours, visits to other centres and student project work.

Lectures comprise Agriculture III, Animal Husbandry III, Engineering III, Rural Economics III. In each case lectures are suited to the particular requirements of the individual diploma courses. In addition, lectures designed to give specialisation are the major feature of this year.

Students are required to undertake project work and to submit an essay of satisfactory standard.

Sporting; Defence Training.

Students are encouraged to take part in activities outside the normal courses. Facilities are provided for cricket, football, tennis, swimming, boxing, rifle shooting, athletics, life saving and debating.

Military training is featured as an integral part of student experience. The Department of Defence has made provision for the following training units to be located at the college: (1) Sub-unit 25th Battalion C.M.F.; (2) Senior Cadets; (3) Air Training Corps.

All inquiries regarding enrolment, fees and courses should be directed to the Principal, Q.A.H.S. and C., Lawes.

In Lockyer Valley.

The college is situated in the Lockyer Valley 60 miles from Brisbane. It occupies about 2,200 acres, the major portion of which is under cultivation. The rich, black soils grow a wide variety of crops, while underground water is used for irrigation of some 300 acres.

An additional 295 acres known as the "Darbalara Farm" some 10 miles away, provides training in farm management and milk production under commercial conditions. Other facilities for practical work include 50 horses, 600 sheep, 350 cattle (both beef and dairy), 300 pigs, a poultry section (4,000 fowls), an apiary section (60 hives), a wide range of farm

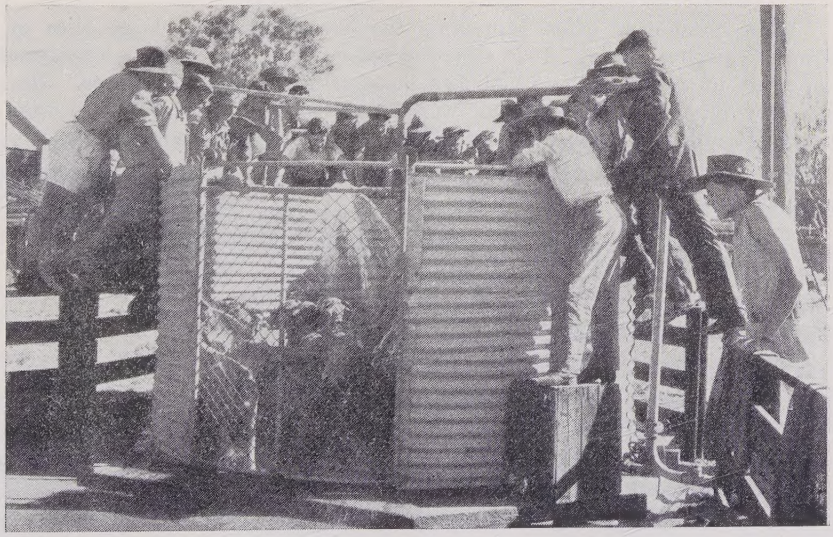


Plate 2.

Students Receiving Instruction in Spray Dipping Sheep.

implements, 25 tractors, irrigation equipment, milking shed and machines, silos, shearing shed, jetting and dipping plant, slaughter house, orchard, butter, cheese and milk drying equipment, jam factory, blacksmithing, tinsmithing, plumbing, carpentry and tractor maintenance workshops.

The college also maintains studs of: Clydesdale horses, A.I.S. and Jersey dairy cattle, Poll Shorthorn beef cattle, Large White and Berkshire pigs, Border Leicester and Southdown sheep, Australorp and White Leghorn poultry and Italian bees.

On the plant side, activities are at present devoted to the production and dissemination of hybrid maize and the seed of some newer pasture grass species not available commercially.

NEED FOR BETTER FARMING.

Mr. Briton sums up the part played by the college in current affairs. "Primary industries to-day," he says, "are faced with a challenge—that is, to meet the ever-increasing demand for food from a rapidly growing world population. Never before has the need for improved farming methods been so acute. The better utilization of agricultural lands, the usage of marginal areas, improved plant and pasture species, and higher producing stock are but a few of the problems facing the farmer.

"Continued research into these problems over recent years has supplied many answers, but it falls to the primary producer to apply these results for the benefit of the community in general.

"Hand in hand with any improved agricultural programme is agricultural education and it is in this direction that the Queensland Agricultural College at Lawes is playing a full part in the development of the State's primary industries."

Off-Season Overhaul of Farm Machinery

Farm machinery often represents the investment of a large slice of a farmer's working capital. It is a good practice therefore, to make a systematic inspection of every machine you own as soon as the season finishes. Do all necessary repairs and replace all worn parts so that the equipment will be in perfect order for immediate use when the new season arrives.

The following hints in particular are worth bearing is mind when storing seasonal equipment.

1. Thoroughly clean down the machine: dirt acts as a moisture trap and causes rust.
2. Grease all grease points.
3. Remove all belts and store in a dry, dark place.
4. Remove all roller chains and either wrap in grease paper or immerse in a container filled with clean sump oil, making sure that the chains rest on a grid and not on the bottom of the container.
5. Adjust any tension or counter balance springs so that they are not maintained under full tension during the storage period.
6. If pneumatic tyres are fitted take the weight off them by raising the machine on blocks and keep the tyres inflated at their specified pressure.
7. Store the machine in the driest possible place.

—C. G. WRAGGE, Agricultural Engineer.

Family Matters . . .

Protect Your Child From Injury

IT IS A SAD THING THAT SO MANY QUEENSLAND CHILDREN EVERY YEAR SUFFER INJURY AT HOME.

To the toddler, the home is a great, big world waiting to be discovered. But, as hospital records show so grimly, the eager little explorer is all too often in peril of injury and even death in the home where he is so loved and wanted.

Nothing but your most careful and constant vigilance can save your toddler from grave dangers.

Statistics show the following to be the leading hazards—please, for your child's sake, heed well the points for prevention:

Danger from Burns.—Burns and scalds are always high on the lists of child accidents. Keep toddlers away from all heat hazards, especially in the kitchen and laundry. Turn handles of saucepans, frying pans, etc., inwards on the stove. Never leave buckets of hot water about. Don't lift anything hot over a child's head. Put hot things in the centre of the table, never have trailing table cloths.

Kerosene Hazards.—Petroleum products, including dry cleaning fluids, and especially kerosene, often poison children. Don't keep them in tempting soft drink bottles, and always store them well out of a toddler's reach.

Pills and Medicines.—There is a danger in the medicine chest, unless it is kept well out of children's reach and preferably locked. Pills and tablets have sometimes proved fatal.

Prevent Falls.—Guard against falls. Have gates at the top of stairs. Be sure the toddler has no means of climbing up to a window sill. Never have highly-polished floors. Don't allow the child to stand in a high chair.

Knives and Scissors.—Keep knives, scissors and all other cutting implements well out of reach of children. Sticks and pencils can also be dangerous, especially if a child runs with them.

Electricity.—Keep electric appliances as much as possible out of the reach of toddlers, and firmly discourage touching switches. Don't have long trailing electric leads.

Safe Toys.—Make sure that toys are safe. See that they have no hard, sharp edges, and take special care that there are no small, removable parts that could be put in the mouth. Check often to see that all play equipment is in safe condition.

Safety at Play.—Without interfering unnecessarily in the play of toddlers, keep a check on their games to make sure they are not doing anything dangerous. Absolutely never allow children to play on the road or even the footpath.

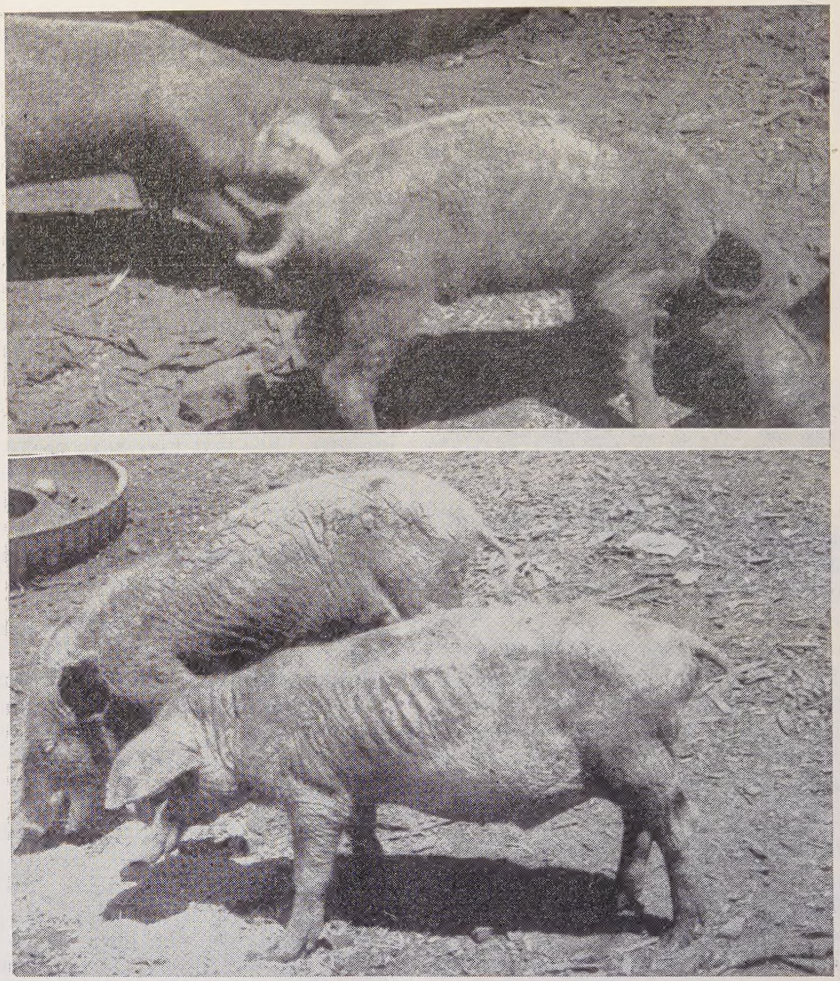
In the Garden.—Ensure garden safety in these ways. Keep all insecticides and weed killers locked away from children. When garden tools are in use put them down in such a way that they could not hurt a child. When you have finished with them, lock them away from children.

These are only some of the home hazards for toddlers. Seeing others and removing them depends on you, and calls for the cultivation of a keen safety sense.

To strengthen your determination in this, just ask yourself how much your child means to you.

This information is supplied by the Queensland Health Education Council, Exhibition Grounds, Gregory Terrace, Brisbane.

These Pigs Have Mange



You can see the hair rubbed off, the crusts and scabs on the thickened skin.

They had good feed but their poor condition is obvious. With mange pigs cannot use the feed they eat.

The table shows the effect on conversion of food to pork:

	Food Consumed lb./wk.	Weight Change Gain lb./wk.
Average Pig with Mange	28·3	$+\frac{1}{2}$
Average Pig with no Mange	28·8	$+5\frac{3}{5}$

Two groups of pigs were identically treated. One group was accidentally infected with mange. The figures represent the *average* pig in each group.

Mange is common and very contagious. Avoid it if you can.

If you happen to get it in your piggery treat early and wipe it out completely. Your pigs will be more profitable without mange.

—*W. R. RAMSAY, Veterinary Officer.*